



F. 321

OSTEOGRAPHIA,
OR THE
ANATOMY
OF THE
BONES.

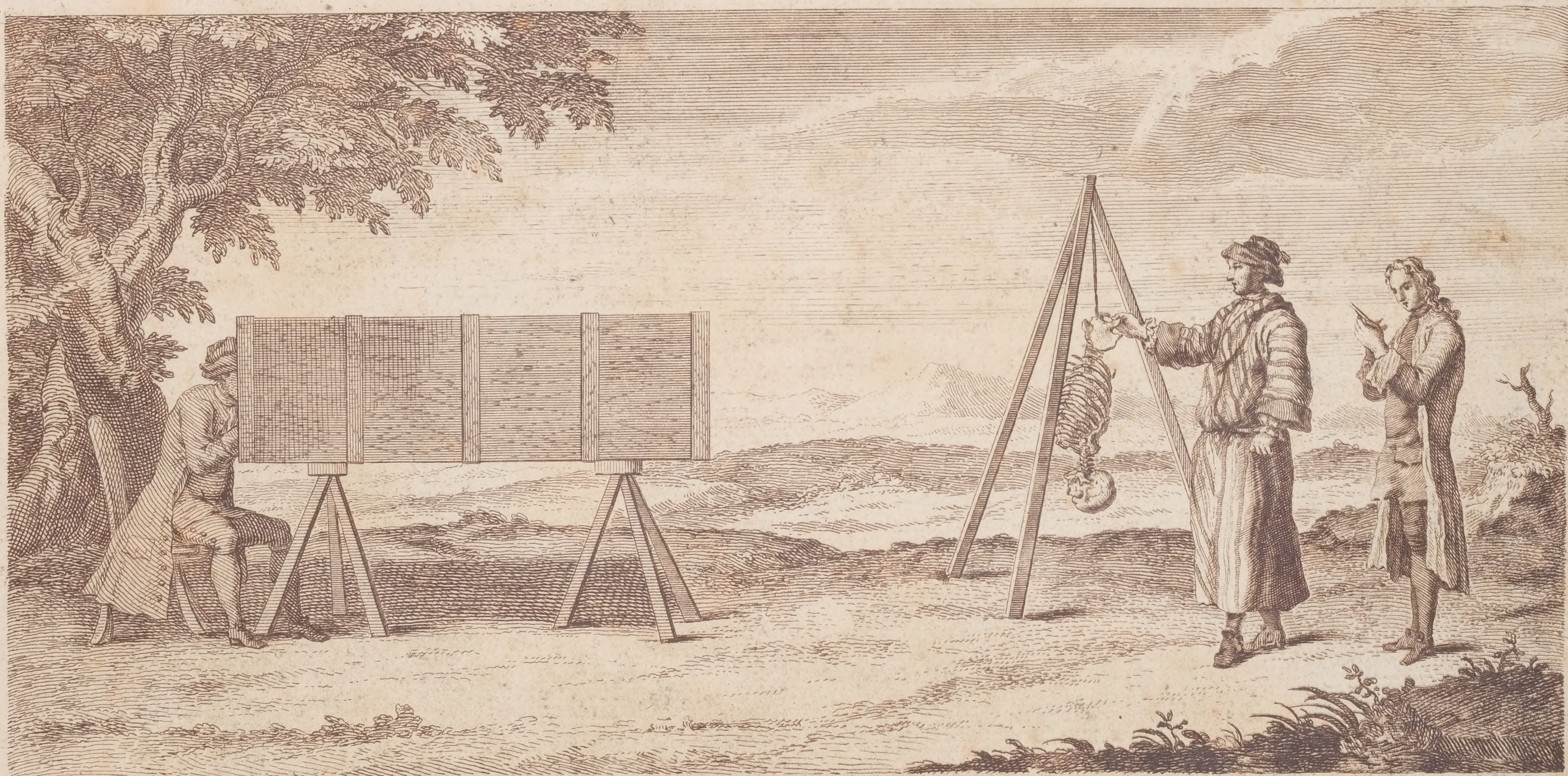
BY WILLIAM CHESELDEN

SURGEON TO HER MAJESTY;

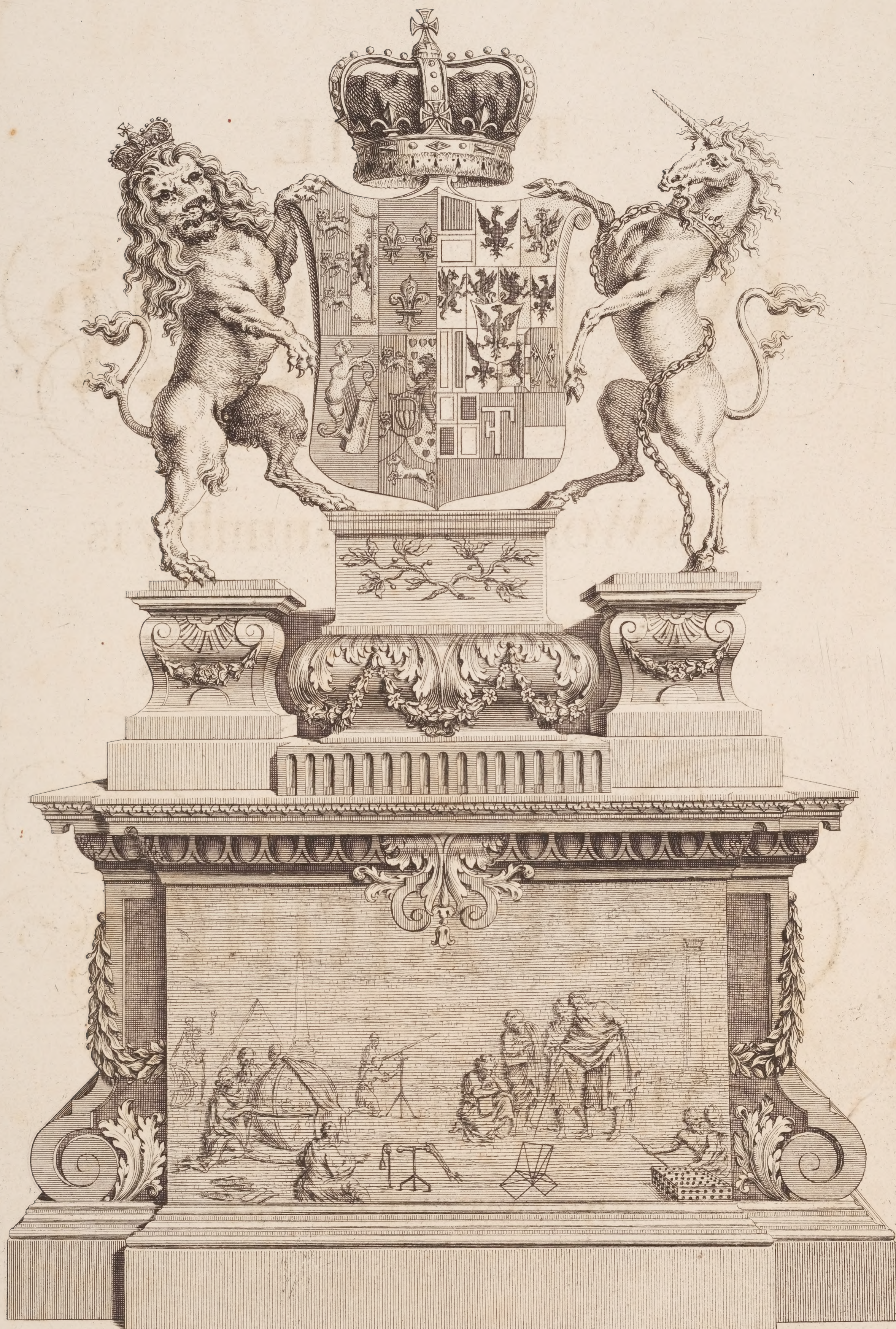
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SURGEON TO ST THOMAS'S HOSPITAL,

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LONDON MDCXXXIII.



TO THE

QUEEN

This Work in all Humility is

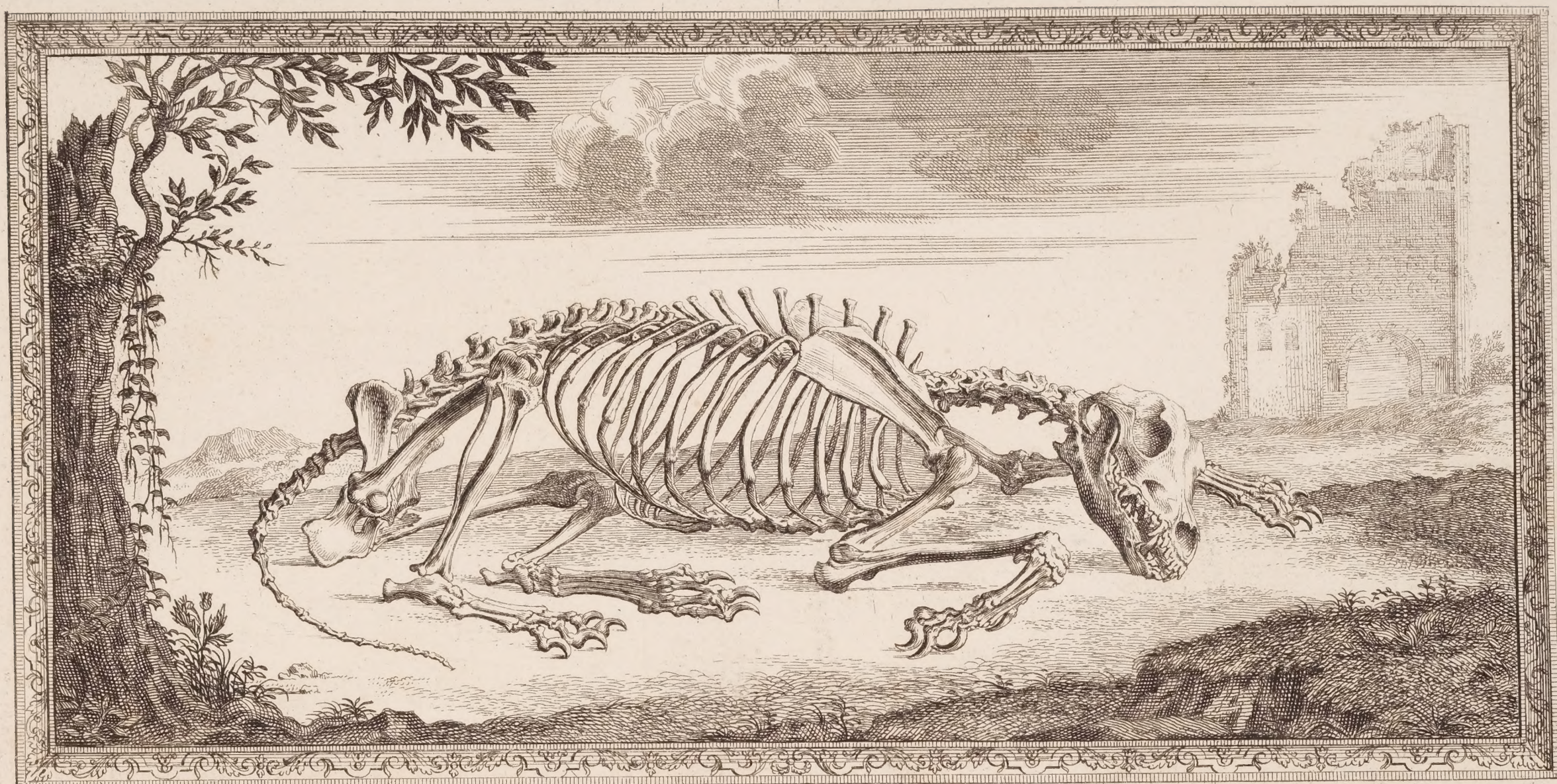
DEDICATED;

By Her
Majesties

Most Dutifull Servant,

WILLIAM CHESELDEN.





T O
T H E R E A D E R .



Very bone in the human body being here delineated as large as the life, and again reduced to lesser scales, in order to shew them united to one another; I thought it useless to make long descriptions, one view of such prints shewing more than the fullest and best description can possibly do; and for this reason in the several chapters the mechanical contrivances of the bones are rather treated of than their shapes.

The first drawing we made was a front view of the scull, (Tab. iii.) in the same attitude with a most excellent one in Vesalius (whose figures were drawn and engraved by Giovanni Calker, as Giorgio Vafari informs us in his book of the lives of the painters; they are performed in so exquisite a taste that they have usually been taken for Titian's, and always considered as a study for painters; yet it must be confessed, that most of them are far short of just representations of the things they were drawn after.) Then we proceeded to others, measuring every part as exactly as we could, but we soon found it impossible to execute the difficult parts of such a work in this way; upon which I contrived (what I had long before meditated) a convenient camera obscura to draw in, with which we corrected

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some of the few designs already made, throwing away others which we had before approved of, and finished the rest with more accuracy and less labour, doing in this way in a few minutes more than could be done without in many hours, I might say in many days: And however sufficient artists may think themselves to execute perfectly the more difficult parts of drawing without such helps, it is well known that when they have occasion to draw straight lines or circles, they do not disdain to use a ruler or compass. But my engravers, Mr. Vandergucht and Mr. Shinevoet not less skilled in drawing than in their own proper art, knew too well the difficulties of representing irregular lines, perspective, and proportion, to despise such assistance, always declaring that it was impossible to do these things so well without.

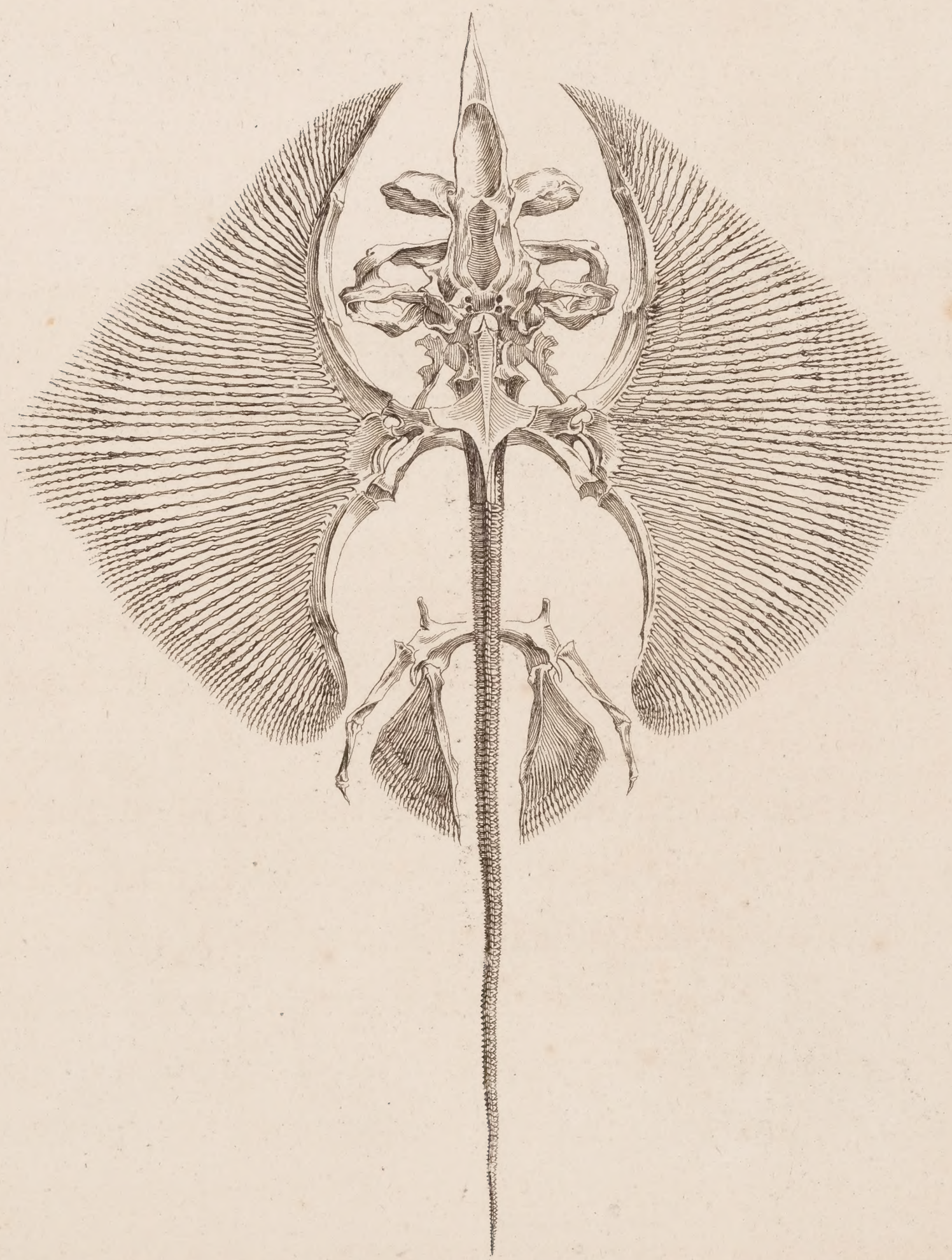
Two of the smaller plates, the head of the man-tyger, and the skeleton of the tortoise, and all the large plates except viii. xi. xxi. and xxxi. were done by Mr. Gerard Vandergucht, and how great an artist he is, the open free stile in which these plates are etched and engraved, and the inimitable manner of expressing the different textures of the parts sufficiently shew.

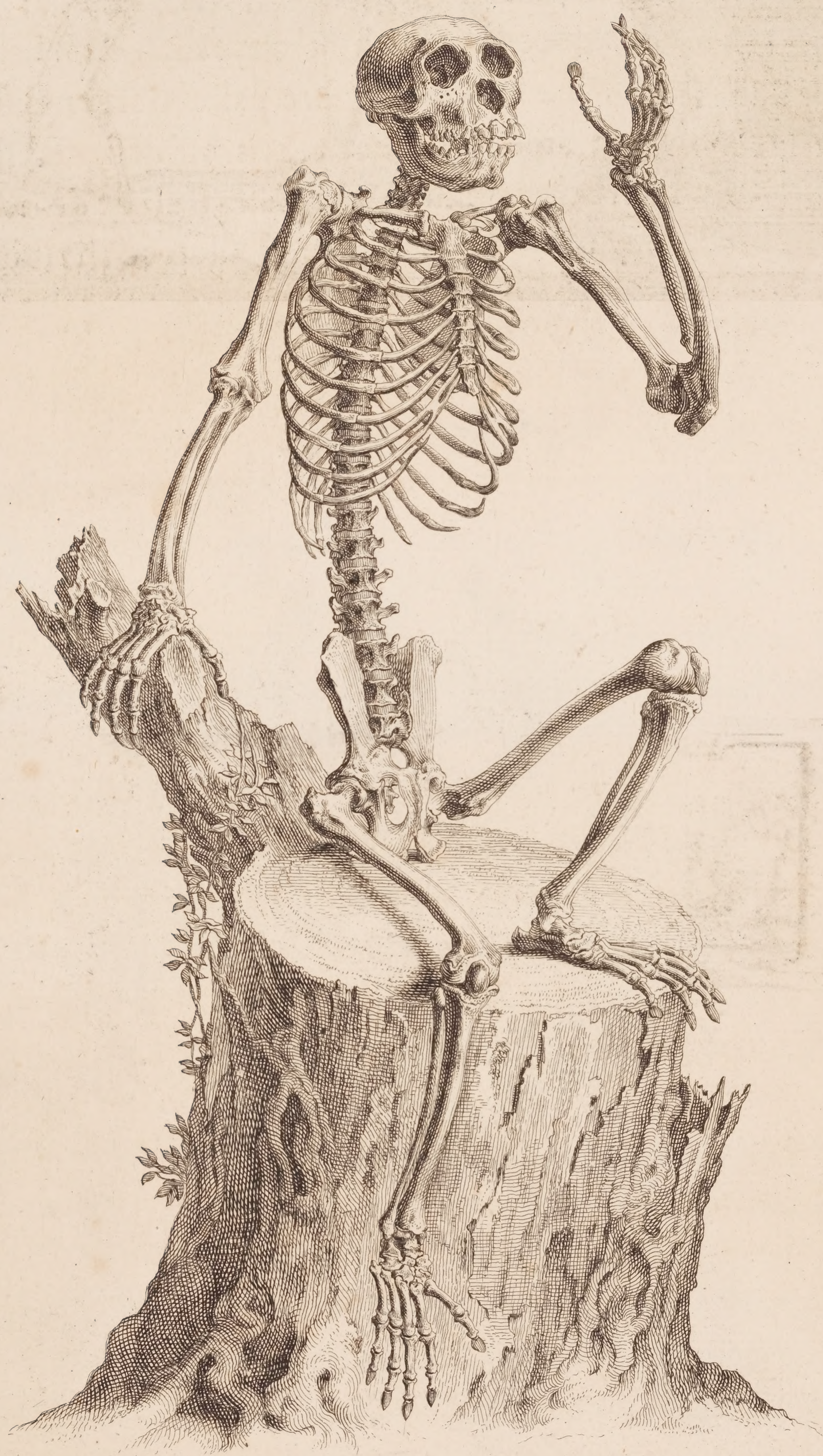
The rest were performed by Mr. Shinevoet who left Holland, his native country, on account of misfortunes. He had done in England before these some excellent works, particularly inside views of cathedral churches, which he was forced to suffer another man to set his name to, and e'er he had finished my work he died. The last thing he attempted was the skeleton of a horse, which being done in the winter in his chamber without the camera, it was so unequal to the rest that I could not use it; his manner of etching, though wonderfully neat and expressive, and well suited to such things as he was mostly employed in, is nevertheless much inferior in stile to that of Mr. Vandergucht.

The actions of all the skeletons both human and comparative, as well as the attitudes of every bone, were my own choice: and where particular parts needed to be more distinctly expressed on account of the anatomy, there I always directed; sometimes in the drawings with the pencil, and often with the needle upon the copper plate, and where the anatomist does not take this care, he will scarce have his work well performed. The expressing the smoothness of the ends of the bones by engraving only with single lines, while the other parts were all etched, was also my contriving; and what advantage this has been to the work will be seen by comparing the smooth part of the acetabulum of the os innominatum in the beginning of the book, with the heads and sockets of other bones.

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When I begun this work I intended a whole system of anatomy adorned with the comparative, in three volumes in this manner, provided I found any encouragement. This volume being nearly finished it was offered by subscription (without solicitations) at four guineas, with a promise that none should be sold afterwards for less than six; but meeting with little success, the further prosecution of this design was laid aside: This volume is made above twenty per cent. (which I always intended) better than the subscription proposals. There are no more printed in english than three hundred, and one hundred prints are taken off designed for a latin or french edition, which being finished, the plates shall be destroyed that the price of the book may never sink in the possession of the subscribers.







THE INTRODUCTION



THE use of the bones is to give shape and firmness to the body, to be levers for the muscles to act upon, and to defend those parts from external injuries that are of greatest consequence to be preserved; as the brain, spinal marrow, heart, &c. Their fibres when first formed are very soft, until by the addition of a matter, which is separated from the blood into them, they grow by degrees to the hardness of a cartilage, and then perfect bone: But this change is neither made in a very short time, nor begun in all the parts of the same bone at once. Flat bones (Tab. i. and xxxi.) that have their fibres directed to all sides, begin to ossify in or near a middle point; but the cylindrical bones and all others, whose fibres are nearly parallel, begin about the middle of each fibre; and thence shoot forth to their extremities; not always in continued lines, but frequently beginning new ossifications, which soon join the former. (Tab. i.) By the continual addition of this ossifying matter, the bones increase till their hardness resists a farther extension; and their hardness always increasing while they are growing, the increase of their growth becomes slower and slower, until they cease to grow at all; and in old persons, (Tab. vi) and consumptive, (Tab. xxiii.)

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and sometimes in diseased or wounded limbs, (Tab. l.) they decrease as well as the fleshy parts, though not so fast because of their hardness. Sometimes the ossifying matter flows out of the bones, and forms bony excrescencies: (Tab. xlii. xlii. and li.) In old men it sometimes fixes on the arteries, and makes them grow bony; and when this happens to a degree, the arteries lose their power to propel the blood, and then the extreme parts mortify: Sometimes membranes and other parts ossify. The most extraordinary case of this kind I have ever known, was of part of the muscular fibres of the heart. (Tab. i.) I have also known one instance of a deficiency of this ossifying matter, in the lower jaw of an adult body; (Tab. ix.) where all that part on one side, which is beyond the teeth, was of a substance between that of a cartilage and a ligament. In children that have died of the rickets, I have found the nodes on the bones soft, spongy and bloody, and in one subject several of them as limber as leather, and the periosteum in some places many times its natural thickness; but the cartilages and cartilaginous epiphyses had no apparent alteration in their texture, though some were swelled to more than twice their natural diameters.

Every cylindrical bone has a large middle cavity, which contains an oily marrow, and a great number of lesser cells towards their extremities, which contain a bloody marrow. (Tab. i. and ii.) The bloody marrow is also found in all spongy cells of bones. (Tab. xiii.) The use of the first kind of marrow I imagine is to soften, and render less brittle, the harder fibres of bones near which it is seated; and that the other marrow is of the same use to the less compact fibres, which the more oily marrow might have made too soft; and that for this reason, there is less of the oily marrow, and more of the bloody in young bones than in old ones. Every one of these cells is lined with a fine membrane, and the marrow in the larger cells is also contained in thin membranous vesicles; in which membranes the vessels are spread, which enter in obliquely, about the middle of the cylindrical bones, from some of whose branches the marrow is secreted, while others of them enter the internal substance of the bones for their nourishment; and the reason why they enter obliquely is, that they may not weaken the bones by dividing too many fibres in the same place. If the bones had been formed of the same quantity of matter without any cavities, they would if they were straight be able to sustain the same weight: But being made hollow, their strength to resist breaking transversely is increased as much as their diameters are increased, without increasing their weights, which mechanism being yet more convenient for

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birds, the bones of their wings, and for the same reason their quills have very large cavities. But the bones in the legs of all animals are more solid, being formed to support weight; and mens bodies being supported by two limbs, the bones of those limbs are therefore made more solid than those of quadrupeds. Insects and most of the smallest animals, have shells instead of bones like lobsters, which serve them also for defence; and the muscles being inserted into the shells at a greater distance from the center of motion of each joint than in animals that have bones, their motions are necessarily slower and stronger as well as more simple; therefore in this sort of animals, quickness of motion, where it is wanted, is procur'd by a number of joints, as may be seen in the legs of a flea; and variety of motions by joints with different directions, as may be observ'd in a lobster. In a fractured bone, in which the same kind of matter that ossified the bones at first is thrown out from the broken ends of a bone, there is formed a mass of callous matter, of equal solidity with any part of the bone, and of equal or greater diameter, which will make the strength of the bone in that place greater than it was before; which is very convenient, for bones when broke, are seldom or never set in so good a direction as that in which they were first formed, and therefore they would be more liable to be broke in the same place again, and would be reunited with greater difficulty, and sometimes not at all, because the callus being less vascular than a bone, it does not so easily admit the ossific matter to flow through it to form a new callus.

Bones that are without motion, as those of the scull, the *ossa innominata*, &c. also bones with their epiphyses, when they meet, press into each other, and form futures; which soon disappear in those that join, while their ossific matter is soft; but those that grow harder before they meet, press more rudely into each other, and make more uneven futures, some of which in the scull endure to the greatest age: (Tab. iii. iv. v. vi.) And sometimes while a bone is ossifying from its center, a distant part begins a new ossification and forms a distinct bone, which may happen to be of any figure. These bones are oftenest found in the lambdoidal future, and are called *ossa triquetra*. (Tab. vi.) But the ends or sides of bones that are intended for motion, are hindered from uniting, by the cartilages which cover them; for when these cartilages are eroded the bones very readily unite. (Tab. xliii. xlv. xlvii. li. liv.) This distemper is called *anchylosis*.

The ends of all the bones that are articulated for very manifest motions, or that are not placed against other bones, are tipped with epiphyses, or

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additional bones; (Tab. i. xxxi. xxxii. xxxiii.) which in some measure determine their growth and figure; for if they had nothing to give bounds to them, they would shoot out like the callus from the broken ends of a bone that is ill set, (Tab. l. li.) and grow as ragged as the edges of bones which are joined by futures; and sometimes epiphyses are made use of to raise processes upon bones for the insertions of muscles, as the trochanters of the thigh bones, (Tab. i. xxxi. xxxii. xxxiii.) where it would weaken the bones too much to have processes raised out of their substance.

The fibres of bones, for ought that we can discover from experiments or microscopical observations, appear to be connected to each other by the same means that the parts of a fibre are connected, that is, by the strong attraction which belongs to particles of matter in contact: but this cohesion of fibre to fibre is not equal to that in the parts of a fibre, though very nearly. Indeed, if it was, a bone would not be a structure of fibres, but one uniform mass, like that of any pure metal, the cohesion of the parts of which are every way alike. Nor are the parts of bones disposed into visible lamellæ, stratum super stratum, as many have painted; for though young bones may in some places be split into lamellæ, yet they not only appear one solid uniform mass to the naked eye, but even with a microscope, till we come to their inner spongy texture, which also appears uniform. Their texture when first formed, is every where loose and spongy, but as they increase, they become in many places very compact and dense, which results in great measure from the pressure of the bellies of the muscles, and other incumbent parts; as appears from the impressions they make on the surfaces of the bones, and the rough spines that rise on the bones in the interstices of the muscles, which are very remarkable in men who have been bred up in hard labour. In those parts of the flat bones that receive but little pressure, the outer laminae only become compact and dense, and the middle part remains spongy; but where the pressure is greatest, as on the scapula (Tab. xxii.) and the middle of the ilium, (Tab. xviii.) they become in an adult, one dense body or table, and are usually thinner in those places than in a child before it is born. The cylindrical or round bones being pressed most in their middles, become there very hard and strong, while their extremities remain spongy, and dilate into large heads, which make stronger joints, and give more room for the origins and insertions of the muscles; and increase the power of the muscles, by removing their axis farther from the center of motion of any joint they move.

All the bones, except so much of the teeth as are out of the sockets,

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and those parts of other bones, which are either covered with cartilages, or where muscles or ligaments arise or are inserted, are covered with a fine membrane, which upon the skull is called pericranium, elsewhere periosteum. It serves for the muscles to slide easily upon, and to hinder them from being lacerated by the roughness and hardness of the bones, it is every where full of small blood vessels, (Tab. i.) which enter the bones for their nourishment; but the internal substance of the larger bones is nourished by the vessels, which enter obliquely through their middles, as has been before observed.

In a child who died of a spotted fever, I found in many of the bones a perfect ecchymosis, and in several places, particularly on the os humeri and os femoris, a quantity of blood between the periosteum and the bones. I am inclined to think that impostumations and carious bones, which sometimes follow fevers and the small pox, may proceed from such extravasations of blood.







CHAPTER I.

SUTURES AND BONES OF THE CRANIUM.



Suture is made by the mutual indentation of one bone with another. Those which have proper names, are here described; those which have not, derive their names from the bones they surround, and are known by them.

Sutura coronalis (Tab. iii. iv.) runs across the skull, from one upper edge of the sphenoidal bone to the other, and joins the parietal bones to the frontal.

Sutura sagittalis (Tab. iii. iv. vi. vii.) joins the parietal bones: It begins at the *os occipitis*, and is continued to the *os frontis*, in children down to the nose; the *os frontis* in them being two bones, and sometimes so in adult bodies.

Sutura lambdoidalis (Tab. v. vi. vii.) joins the back part of the *osseus bregmaticus*, or parietal bones, to the upper part of the occipital: In this suture are frequently observed small bones called *osseus triquetra*, and sometimes in other sutures.

Sutura squamosa (Tab. iii. iv. v. vi.) is made by the upper part of the temporal and sphenoidal bones, wrapping over the lower edges of the parietal bones.

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Sutura transversalis (Tab. iii. iv.) runs across the face, through the bottoms of the orbits of the eyes; it joins the lower edge of the frontal bone to the *os sphenoides*, *maxillæ superioris*, *ossa nasi*, *ungues*, *plana*, *palati*, and *jugalia*, or *malarum*.

The skull being divided into many bones, is neither so subject to fractures, nor to have fractures so far extended, as it would have been were it composed of one bone only. This structure is also convenient for the ossification of the bones, as has been already shewn, and for the birth; because these bones not being perfect at that time, may be pressed together and make the head less.

Ten of the bones of the head compose the cranium, to contain the brain and defend it from external injuries.

Ossa parietalia or *bregmatis* (Tab. iv. vi. vii.) are two large bones which compose the superior and lateral parts of the skull; on the inside they are remarkably imprinted by the arteries of the *dura mater*.

Os frontis (Tab. iii. iv. vii.) makes the upper and forepart of the cranium; its lower parts compose the upper parts of the orbits of the eyes, where on its insides are impressed the convuli of the brain, which unevennesses help to keep that part of the brain steady; in its middle above the *os ethmoides* usually arises a thin spine, which strengthens that part of the bone, it being otherwise weak from its flatness. In some skulls this spine is wanting; but then the bone is usually thicker in that place, and from its middle, externally, goes a process which supports the bones of the nose. Immediately above the *os ethmoides* in this bone is a small blind hole, through which runs a vein into the beginning of the longitudinal sinus of the *dura mater*; and on the upper edge of each orbit, a small perforation, or a notch, through which nerves and an artery pass secure to the forehead; it has also a small hole in each orbit near the *os planum*, through which passes a branch of the fifth pair of nerves. In the substance of this bone near the nose are two, three, four, and sometimes five sinuses, which open into the nose; (Tab. vii.) they differ very much in different persons, and are very rarely found in children. These sinuses, and the spine in this bone, make it very dangerous, if not impracticable, to apply a trephine on the middle and lower part of the forehead.

Os ethmoides or *cribriforme* (Tab. vii. viii.) is a small bone about two inches in circumference, seated in the anterior part of the basis of the skull, being almost surrounded by the last described bone; it is full of holes like a sieve, through which it is said the olfactory nerves pass, which I could never discover. In its middle arises a large process named *crista galli*:

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And opposite to this a thin one which in part divides the nose. The greater part of the *laminæ spongiosæ* in the nose belong to this bone. (Tab. v. vii. viii.)

Os sphenoides, (Tab. iv. v. vi. vii. viii.) is of a very irregular figure; it is seated in the middle of the basis of the skull, bounded by the *os frontis*, *ethmoides*, *vomer*, *occipitis*, *maxillæ superioris*, *ossa parietalia*, *palati*, *malarum*, *temporum*, and *petrosa*, which are parts of the former bones. In its inside next the brain is a cavity named *fella turcica*, which is bounded by four processes called *clinoides*; under the two foremost of which pass the internal carotid arteries, and from their outsides are continued two thin long processes upon that part of the frontal bone, which separates the anterior lobes of the brain from the posterior; opposite to the *fella turcica* is a process which makes part of the *septum narium*. On the outside of the skull adjoining to the upper jaw, are two processes of this bone on each side, named *pterygoides*, from which arise one on each side near the palate, which have no name; over these pass the tendons of the *pterygostaphylini externi* muscles; and nearer towards the occiput, between these and the styloid processes of the *ossa petrosa*, arise two more small rugged processes; and under the *fella turcica*, in this bone, is a sinus or two, for the most part, in adults, but in children only such a spongy substance as is seen in the ends of some of the bones. At the inside of the basis of the two anterior clinoid processes are two round holes, which are the first foramina of the skull; through these the optick nerves pass; almost under these, towards the sides of the skull, are two irregular flits named *foramina lacera*, or the second foramina of the skull, through which pass nerves and blood-vessels into the orbits of the eyes; and under these, towards the occiput are two round holes, which are the third foramina, through which pass nerves to the face; about half an inch nearer the occiput are two more of an oval figure, which are the fourth foramina, through which pass the largest branches of the fifth pair of nerves; and a straw's breadth farther two very small ones called the fifth foramina, through which those branches of the carotid arteries enter that are bestowed upon the *dura mater*. Between this last described bone and the *ossa petrosa* are two large rough holes, in which I have seen large veins; and from these holes, through part of the *os sphenoides*, under the pterygoid processes, are small holes, through which pass arteries to the back part of the nose.

Ossa temporum, (Tab. iii. iv. v. vi. vii.) are situated below the parietal bones, at the middle and lower parts of the sides of the skull; they have

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each at their back-parts one large spongy process called *mammillaris*, or *maстоideus*, and from the lower and middle parts of each a process which joins the *ossa malarum*, named *jugalis* or *zygomaticus*.

Ossa petrosa lie between the former bones and the occipital bones, or are truly portions of the former bones, being never found separate in adult bodies. They have each on their outsides one long slender process called *styliformis*, and near the side of this process a foramen, which runs obliquely forwards into the scull, through which the carotid arteries pass to the brain; these are the sixth foramina, and one foramen in the inside of the scull leading to the organs of hearing, which are the seventh foramina. The ridge on the upper parts of each of these bones help to keep the brain steady, and are strong supports to the thin and flat parts of the scull, which else would be exceeding weak. What remains of this bone belongs properly to a discourse on the organs of hearing.

Between the last described bones and the following bone, are two large holes, which are the eighth foramina. Through these holes pass the eighth pair of nerves and lateral sinuses; sometimes they are two on each side, one for the nerve and one for the sinus. To these we may add another very small one on each side, through which pass the *portiones duræ* of the auditory nerves; and sometimes there is another for an artery.

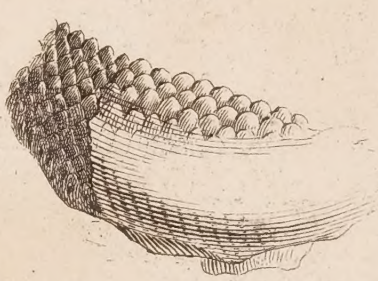
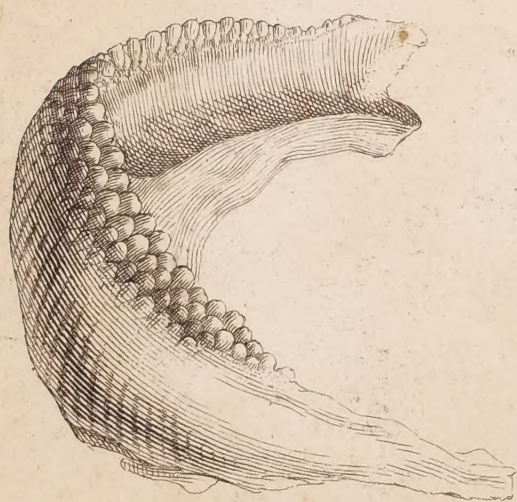
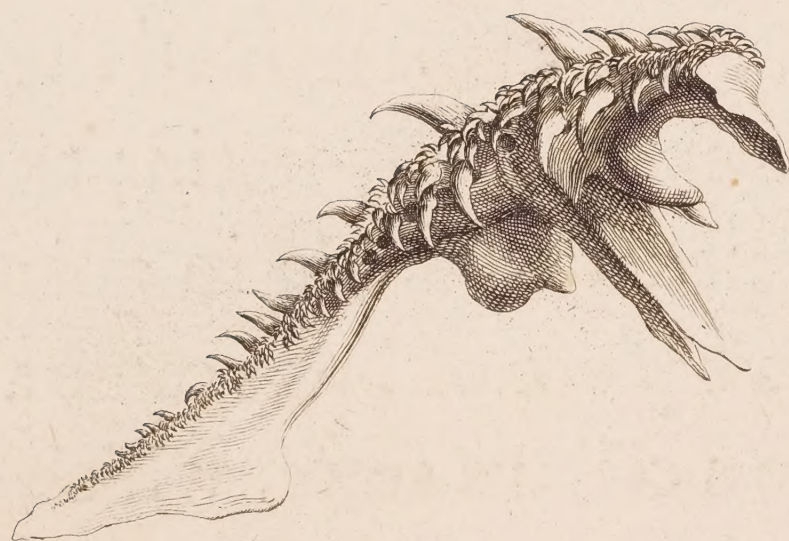
Os occipitis, (Tab. iv. v. vi. vii.) makes all the back-part of the scull: It is bounded by the sphenoidal, temporal, petrosal, and parietal bones; it has two small apophyses, by which it is articulated to the spine; near those apophyses are two small foramina, which are the ninth of the scull; through these pass the ninth pair of nerves; and between these is the great or tenth foramen, through which the medulla oblongata descends into the spine, the cervical arteries enter, and the cervical veins pass out. In the inside of this bone is a crucial spine impressed by the longitudinal and lateral sinuses; and on the outside opposite to the middle of this spine, in some bodies, is an apophysis, and from that down to the great foramen a small thin spine. The spines in this bone are of the same use with those in the *os frontis*, &c. viz. to strengthen it. The thinner parts of this bone are also defended by the muscles that cover them; which provision is very necessary, because we can least defend this part, and blows here are of worse consequence than on any other part of the scull, because wounds in the cerebellum, which is underneath, are mortal. There are in most sculls, a foramen behind each apophysis of the occipital bone; through which pass sinuses from the lateral sinuses to the external cervical veins: By means of these communications, as in all other communications of

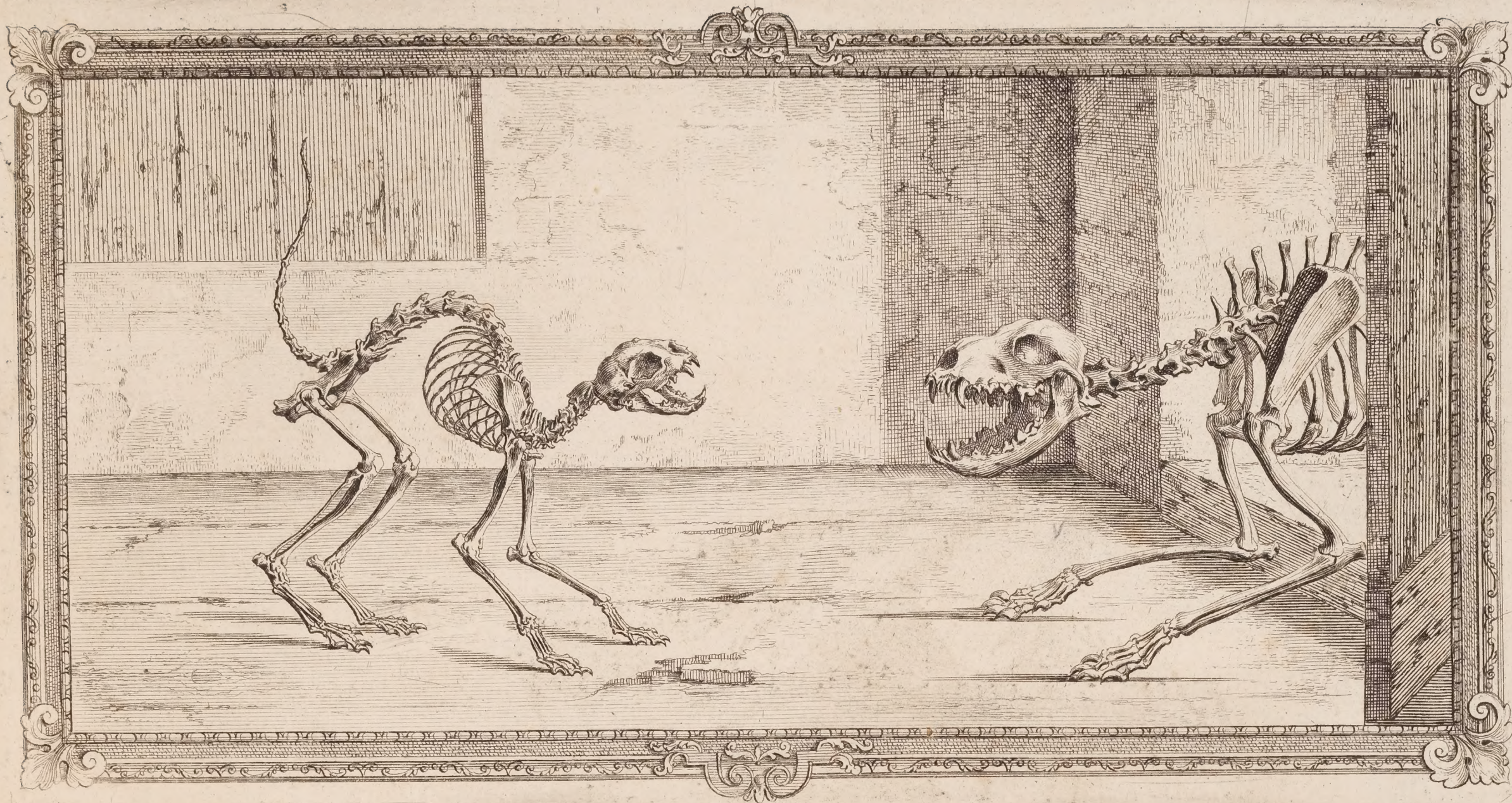
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the sinuses, the blood passes from those that happen to be surcharged by any posture of the head, into those that from the same posture would have been almost empty. Such skulls as want these foramina have two sinuses for the same purpose.

A case of a fractured skull in a girl nine years of age, Vide Tab. vi. who was brought into the hospital seven days after the accident, having had all that time very bad symptoms; I opened the scalp immediately, and let out about two ounces of grumous blood, and laid the skull bare near four inches one way, and three the other, and tied the blood vessels. The fracture extended across the os bregmatis, from the sagittal suture to the temporal bone; that part next the os frontis was depressed equal to its thickness, and a great deal of extravasated blood and matter lay under the other part of the same bone. I made two perforations with the trephine, close to the fracture, that I might raise it up steadily through both, and have more room for the extravasated blood to discharge: And ten days after the former operation, the apertures being almost filled up with the callous, I was obliged to make another perforation, to discharge the matter more freely; for during a month, it ran through all the dressings down her face, twice every day, and was exceedingly foetid; and for the space of five months the matter decreased very little in quantity, but grew less and less offensive, when the least piece of bone came away leaving some very small parts, from whence a callous arose, which perfectly supplied its place, and sixteen days after the larger piece came away entire; then the matter grew good, and not too much in quantity, and that space filled with a common cicatrix, through which the motions of the vessels of the brain are still plainly to be seen, though she was cured many years since.







CHAPTER II.

OF THE BONES OF THE FACE, &c.



Sfa Nasi, (Tab. iii. iv. vii.) make the upper part of the nose; they form that kind of arch which is fittest to sustain such injuries as the nose is most exposed to.

Ossa malarum. (Tab. iii. iv.) These bones compose the anterior, lower and outer parts of the orbits of the eyes; they have each a short process, which processes join the *processus jugales* of the temporal bones, and form arches which have been called *ossa jugalia*.

Ossa unguis, (Tab. iii. iv.) are seated immediately below the *os frontis* towards the nose in the orbits of the eyes, whose anterior and inner parts they help to compose; and between each of them and the upper jaw is a foramen as large as a goose quill, into which the *puncta lacrymalia* lead, to carry off any superfluous moisture from the eyes into the nose.

Ossa plana (Tab. iii. iv. viii.) are seated immediately beyond the foregoing bones, in the orbits of the eyes, and are near thrice as big. They are rather smooth surfaces of the *os spongiosum*, than distinct bones, and are very often imperfect.

Maxilla superior, (Tab. iii. iv. v. vii. ix.) is always described single, though it is manifestly divided by a future which is scarce ever obliterated; it has

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two processes, which join the *os frontis*, and make part of the nose, and another, which joins to the cartilage of the *septum nasi*. Its upper and outward parts make the lower parts of the orbits of the eyes; its lower side, all that part of the face under the cheeks, eyes, and nose to the mouth, and two thirds of the roof of the mouth. A little below the orbits of the eyes, in this bone, are two holes, and behind the *dentes incisores* one more, which divides into two, as it opens into the nose, on each side the *septum nasi*. Between the posterior grinding-teeth and the orbits of the eyes are two great sinuses, called *antra maxillæ superioris*, which open into the upper part of the nose. And in the lower edge of this jaw are the *alveoli*, or sockets for the teeth. Part of the sides of these cavities, that lie next the nose, are only membranes which make the cavities like drums, perhaps to give a grave sound to the voice when we let part of it through the nose; but brutes not needing such variety of sounds, have these cavities open to the nose, and filled with *lamellæ*, which are covered with membranes, in which the olfactory nerves terminate, for a more exquisite sense of smelling than is necessary for men. Imposthumations sometimes happen in these cavities: The signs of this disease are great pain about the part, matter in the nose on the side diseased, stinking breath and rotten teeth. Mr. Cowper first described this case, and the cure; which is performed by drawing out the last tooth but one, or two, or more, if rotten; and through their sockets making a perforation into the antrum; or if drawing a tooth makes a perforation, which sometimes happens, and perhaps gave the first hint of this cure, then that opening must be enlarged, if it is not sufficient to discharge the matter.

Ossa palati, (Tab. v. vii. viii.) are two small bones that make the back part of the roof of the mouth, and a small part of the bottom of each orbit. Between the *ossa palati* and *os maxillare* near the pterygoid processes of the sphenoidal bone, are two small foramina, through which arteries and nerves pass to the palate.

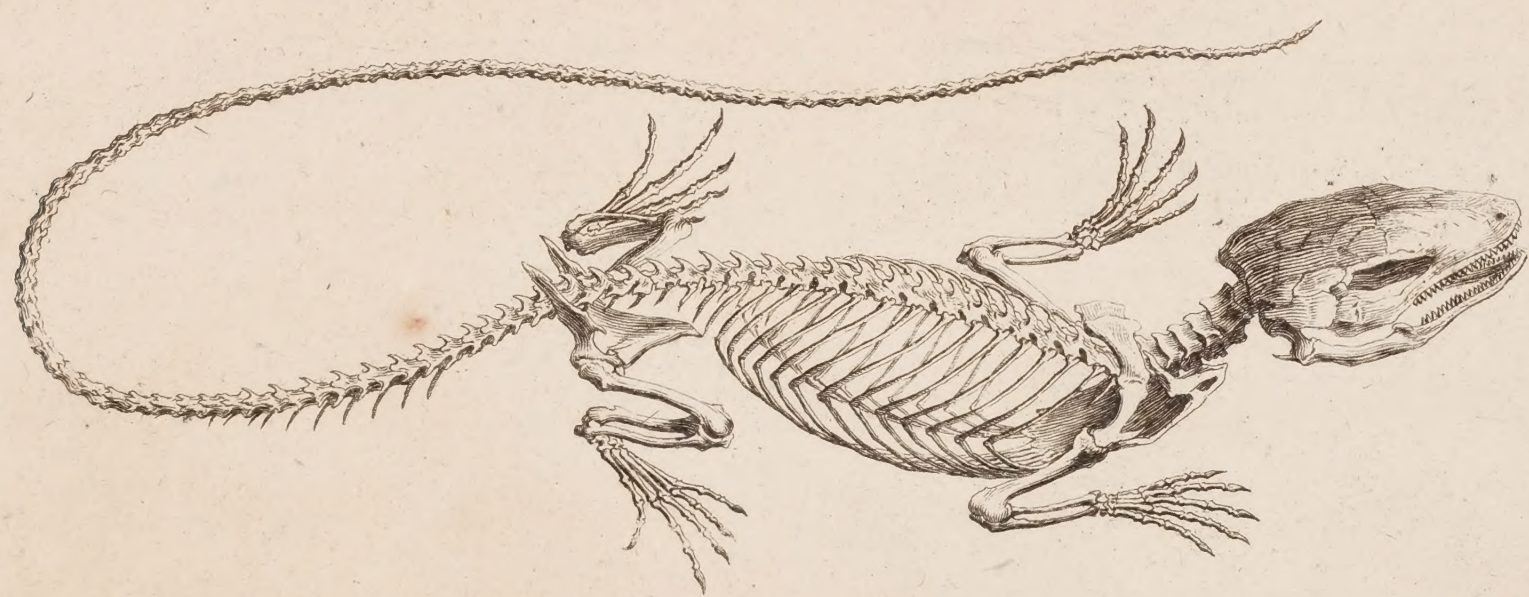
Os vomer, (Tab. v. vii. viii.) is seated between the bones of the palate, and the sphenoidal bone. It is also joined to the process of the *ethmoides*, and part of the lower jaw. Its fore-part is spongy, and is continued to the middle cartilage of the nose. This bone and cartilage are the *septum nasi*.

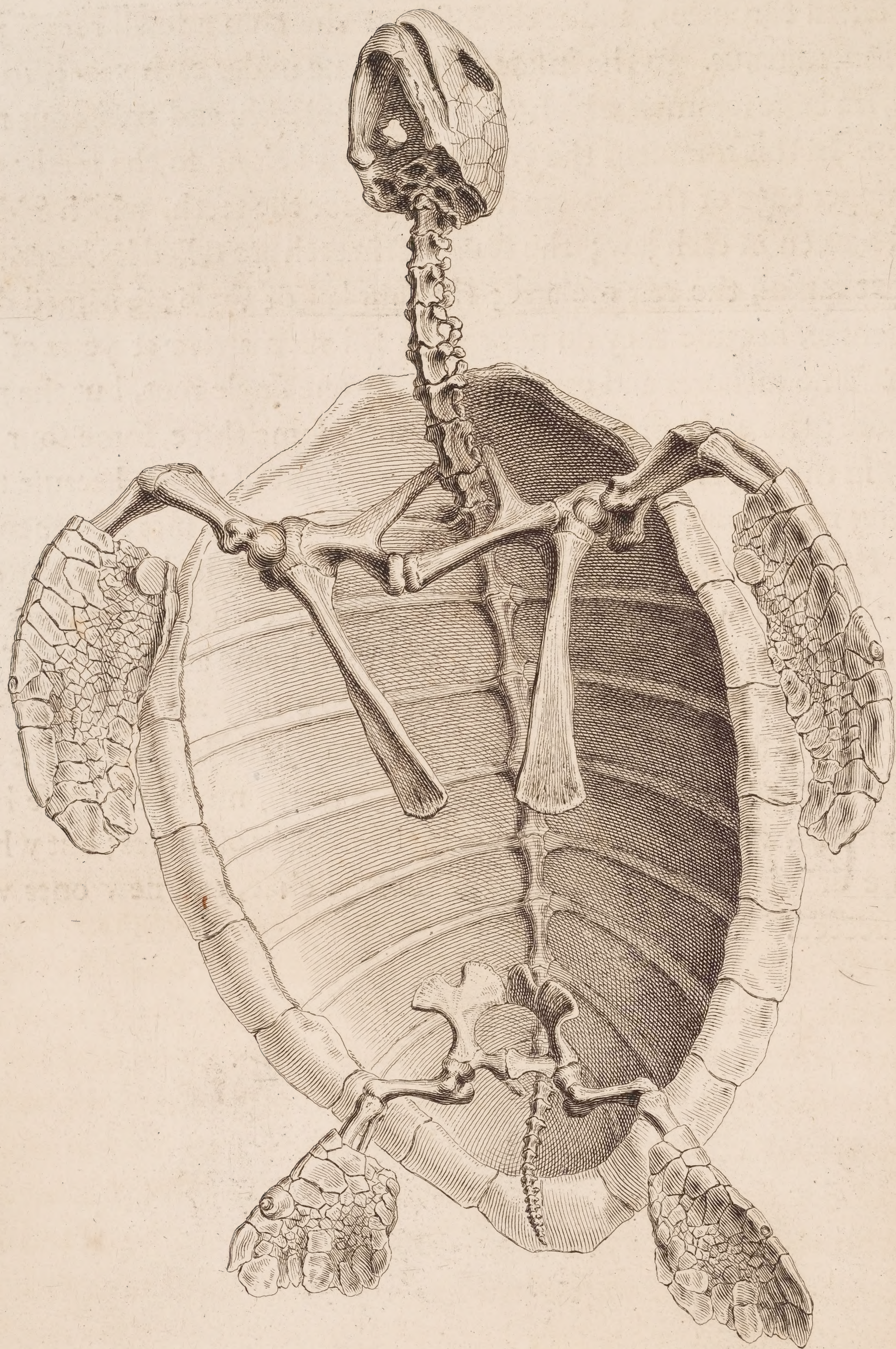
Os spongiosum, (Tab. viii.) is usually treated as a distinct bone, though it is only the spongy *laminæ* in the nose, of the *os ethmoides* and *ossa plana*, but chiefly of the *os ethmoides*, to which it always adheres. In considering these *lamellæ* as a distinct bone, we follow the ancients, who did

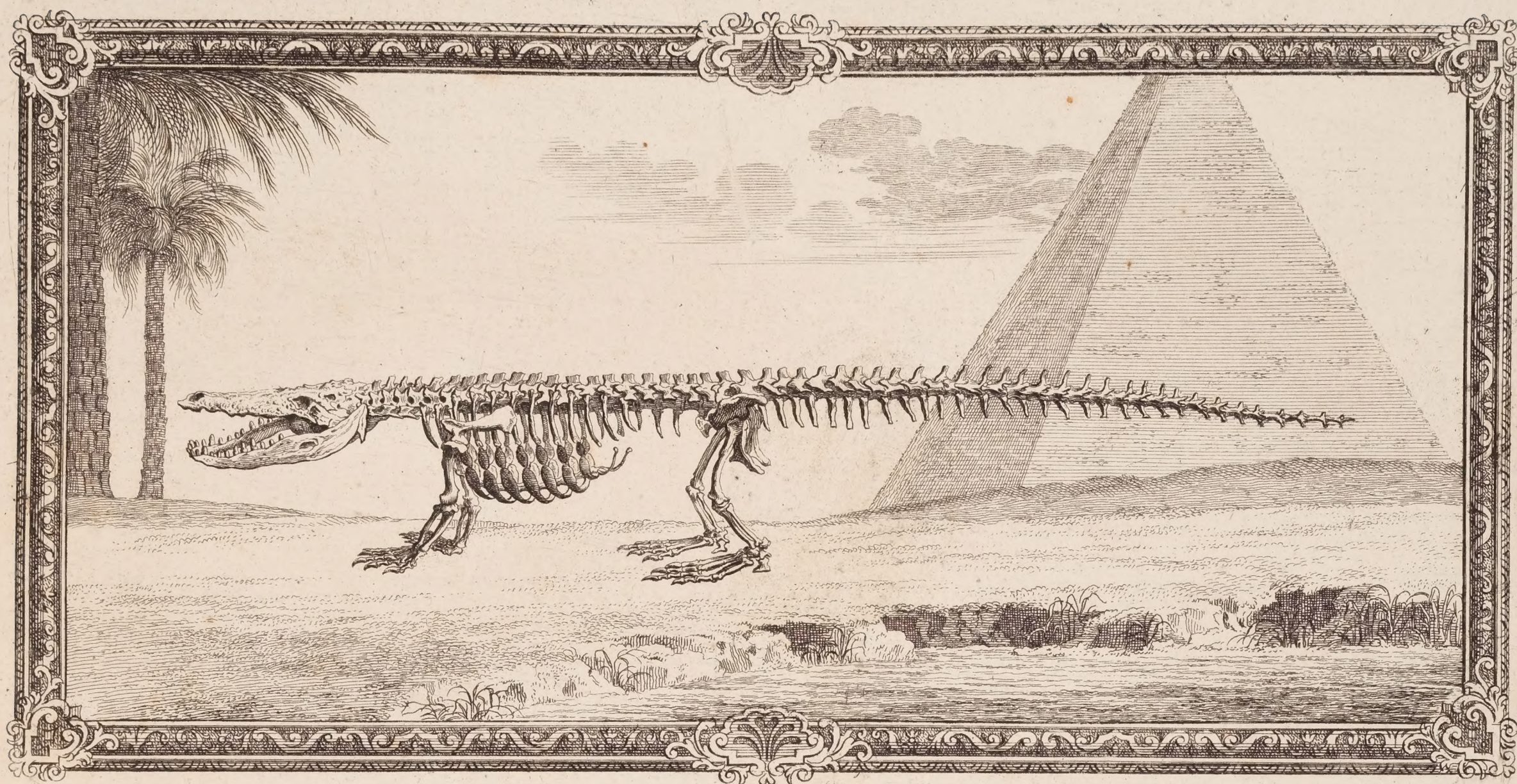
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not distinguish the bones of the scull only, as they are divided by futures, but according to the differences of their texture, figure, situation, or use. Thus they called these parts *os spongiosum*; a process of the temporal bone, joined to the *os malæ*, *os jugale*, &c.

Maxilla inferior (Tab. ix.) is articulated with loose cartilages to the temporal bones, by two processes, named *condyloides*. Near these arise two more, called *coronales*, and at the inside of the chin a small rough process *innominatus*. In the inside of this bone under each process *coronalis*, is a large foramen which runs under the teeth, and passes out near the chin. In this foramen, the vessels pass that belong to the teeth; and in the upper edge of this jaw are the sockets for the teeth, which seldom exceed sixteen in each jaw; the four first in each are called *incisores*, the two next *canini*, the rest *molars*; the four last of these are named *dentes sapientiæ*, because they do not appear till men arrive at years of discretion. The *incisores* and *canini* have only one single root, but the *molars* more; the eight first, two; and the rest, some three, some four, especially in the upper jaw; where also they are spread wider, because that jaw being more spongy than the other, the teeth need more space to fix them. Each of these roots has a foramen, through which pass an artery, vein, and nerve, which are expanded in a fine membrane that lines the cavity in each tooth. These vessels and membrane are the seat of the tooth-ach. The teeth of children cast off while they are growing; but the succeeding teeth arise in new sockets, deeper and larger than the former; for the jaws increasing faster than the teeth, must otherwise have left chasms between them, such as are in the mouths of brutes; but where teeth are drawn in adult bodies, the sockets close, and new ones very rarely succeed.







CHAPTER III.

OF THE BONES OF THE TRUNK.



THE bones of the trunk are those which compose the spine or chain of bones from the head down to the rump, the ribs and sternum, to which may justly be added the ossa innominata.

The spine, is composed of twenty four vertebræ, (each of which in a young child is three bones) besides those of the os sacrum and coccygis; seven belong to the neck, the first of which is called atlas, because it immediately supports the head; its upper side has two cavities, into which the apophyses of the os occipitis are received, but these two cavities together, unlike all other joints, are laterally portions of concentric circles, by which means they are but as one joint, and so suffer the head to move easily side-ways, which otherwise it could no more do than the knee, which also has two heads and two cavities. The under side of this bone has a very flat articulation with the next, which fits it for a rotatory motion. The second vertebra is called dentata, or axis, from a process which passes through the former bone, and is the axis upon which it turns; nevertheless all the vertebræ of the neck contribute something to the rotatory motion of the head. The processus dentatus is strongly tied to the os occipitis, and to the atlas by li-

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gaments, to prevent its hurting the spinal marrow. Twelve of which belong to the back, five to the loins. The os sacrum is sometimes five, sometimes six bones, and the os coccygis four. If this chain had been composed of fewer bones, they must have either not been capable of bending so much as they do, or have bent more in each joint, which would have pressed the spinal marrow, the ill consequences of which are sufficiently seen in persons grown crooked, or who have had distortions from external accidents.

The uppermost vertebra of the neck, being fixed behind the center of gravity of the head, the neck is therefore so far bent forward, as that the last of these vertebræ (which has a firm bearing upon those of the thorax) may be exactly under the center of gravity. Those of the thorax are bent backwards, behind the center of motion, to make room for the parts contained in the thorax, and that they might not be made too weak by this structure, they are formed for less motion than other vertebræ; and those in particular, who are bent farthest from the center of gravity have the least motion. The middle vertebræ of the loins, are again bent forwards under the center of gravity, or near it; and from thence they go backwards to the os sacrum, where being fixed to the ossa innominata behind the center of gravity, the articulation is therefore firm and without motion, and from thence the ossa innominata are so formed, as that their sockets into which the thigh bones are fixed, where there is a free motion, are exactly under the center of gravity. In brutes the spine is differently formed, according to the actions for which they are designed. (See chapter x.)

In all these vertebræ, except the first, is a middle anterior spongy body, by which they are firmly articulated with a very strong intervening ligament; and from the middle of the hind part of each, except the first, stands a process named spinalis, and from every one a process on each side, called transversalis, and two superior, and two inferior short ones; by which the back parts of the vertebræ are articulated, named obliqui, superiores, and inferiores.

The fore part of the seven vertebræ of the neck, and two upper of the back, are flat forwards, to make room for the aspera arteria and gula: The third and fourth of the back acute, to give way to the vessels of the lungs and heart, and bent to the right side for the better situation of the heart, which makes that side of the breast more convex than the other, and therefore stronger; which seems advantageous to the right arm, its motions depending upon the support it receives from the breast.

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hence, I think, it seems that the almost universal preference of that arm is not an arbitrary thing, but founded upon observation, that it is capable of more perfect actions than the other.

The spinal processes (Tab. x. xi.) of the second, third, fourth and fifth vertebræ of the neck are forked, the two last long and horizontal, the three or four upper ones of the back like them, only a little declining, the middle ones of the back run obliquely downwards, and the processes of the remaining vertebræ become successively thicker, stronger, and less declining; those of the loins being horizontal, like the last of the neck. The muscles that are inserted into the spinal processes of the vertebræ of the neck and loins will act with more strength than those of the back, because their processes being perpendicular to the spine, they are longer leavers; besides, those of the back almost touch one another, to prevent much motion, because it would interrupt respiration; but more motion being necessary in the neck and loins, their processes are made fit for it.

The transverse processes (Tab. x. xi.) of the vertebræ of the neck are perforated, for the admission of the cervical blood-vessels, and bowed downwards, and hollowed, for the passage of the cervical nerves. The eight or nine upper ones of the back, receive the upper ribs; and the rest, with those of the loins, serve only for origins and insertions of muscles.

Os sacrum (Tab. xii.) has two upper oblique processes, some small spinal processes, and two foramina in each interstice of the bones it is composed of, both before and behind. Ossa coccygis have none of these parts.

Through every bone of the spine, the ossa coccygis excepted (Tab. xiii.) is a large foramen, which together make a chanel through the spine, in which is contained the medulla spinalis; and in each space between the vertebræ are two large holes for the nerves to pass out.

'Tis worth considering, the provision that is made to prevent luxations in this chain of bones, such luxations being worse than any other, because of the spinal marrow which is contain'd within these bones. The bodies of the vertebræ are all in the same manner connected by strong intervening ligaments or cartilages. In the neck the oblique processes of the received bone are wrapped over those of the receiving bone, which forbids their luxating forwards. The transverse processes with a small apophysis of the body of the same bone, in like manner, secures them from slipping backwards, and an apophysis on each side of the body of the receiving bone, hinders them from slipping to either side. The vertebræ of the back are hindered from dislocating forwards by the same provision with those of the neck; and from luxating backwards, by the ribs which are fastened

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to the transverse processes of the inferior vertebræ, and against the back-part of the body of the next superior; they also hinder them from dislocating to either side; but the last ribs are not fixed to the transverse processes of the vertebræ of the back, and therefore it is that luxations are most frequently seen in this part; but the vertebræ of the loins are received into deep cavities, and are tyed with much stronger ligaments for their security. Each joint of the vertebræ, except the two uppermost, has two centers of motion, one upon the bodies of the vertebræ, when the trunk is bowed forwards; and the other at the articulations of the oblique processes, when the body is bowed backwards; from which structure the extensors will have about twice the leaver to act with, and consequently twice the power to raise the trunk into an erect posture, that they have to carry it beyond that posture; for then the oblique processes begin to be the centre of motion, and give a like advantage to the benders. Without this contrivance it would be more difficult to keep the body erect, or to recover an erect posture with considerable strength after a bend of the body.

The ribs (Tab. xiv. xv.) are twelve in number on each side; the seven uppermost are called true ribs, because their cartilages reach the sternum; and the five lowest are called bastard-ribs. They are articulated to the bodies of the twelve vertebræ of the back, and all, except the two or three last, are articulated to their transverse processes, and the under side of the middle ribs are hollowed for the passage of the intercostal vessels. They defend the parts contained in the breast, and when they are drawn upwards, the cavity of the breast is enlarged for inspiration, and so the contrary. In two children, which I have dissected, I found the ribs broke inwards, and on the outside a very plain print of a thumb and fingers, which had been done by their nurses hoisting them up on one hand, taking hold of their breasts, and being often repeated, had broke the ribs inwards like a green stick, without separating the broken ends of them; I have also very frequently seen the shape of childrens breasts quite spoiled by such tricks, which have occasioned weakness of body, crookedness, and other diseases.

Sternum, or breast-bone (Tab. xvi. xvii.) is generally made up of three spongy bones, sometimes more; to this the true ribs are articulated by their cartilages, which sometimes in robust men have moveable joints, such as are seen in oxen and other quadrupeds. At the end of the sternum is the cartilago ensiformis, so called from its shape, but it very often is double; there is also frequently found variety in the form of the car-

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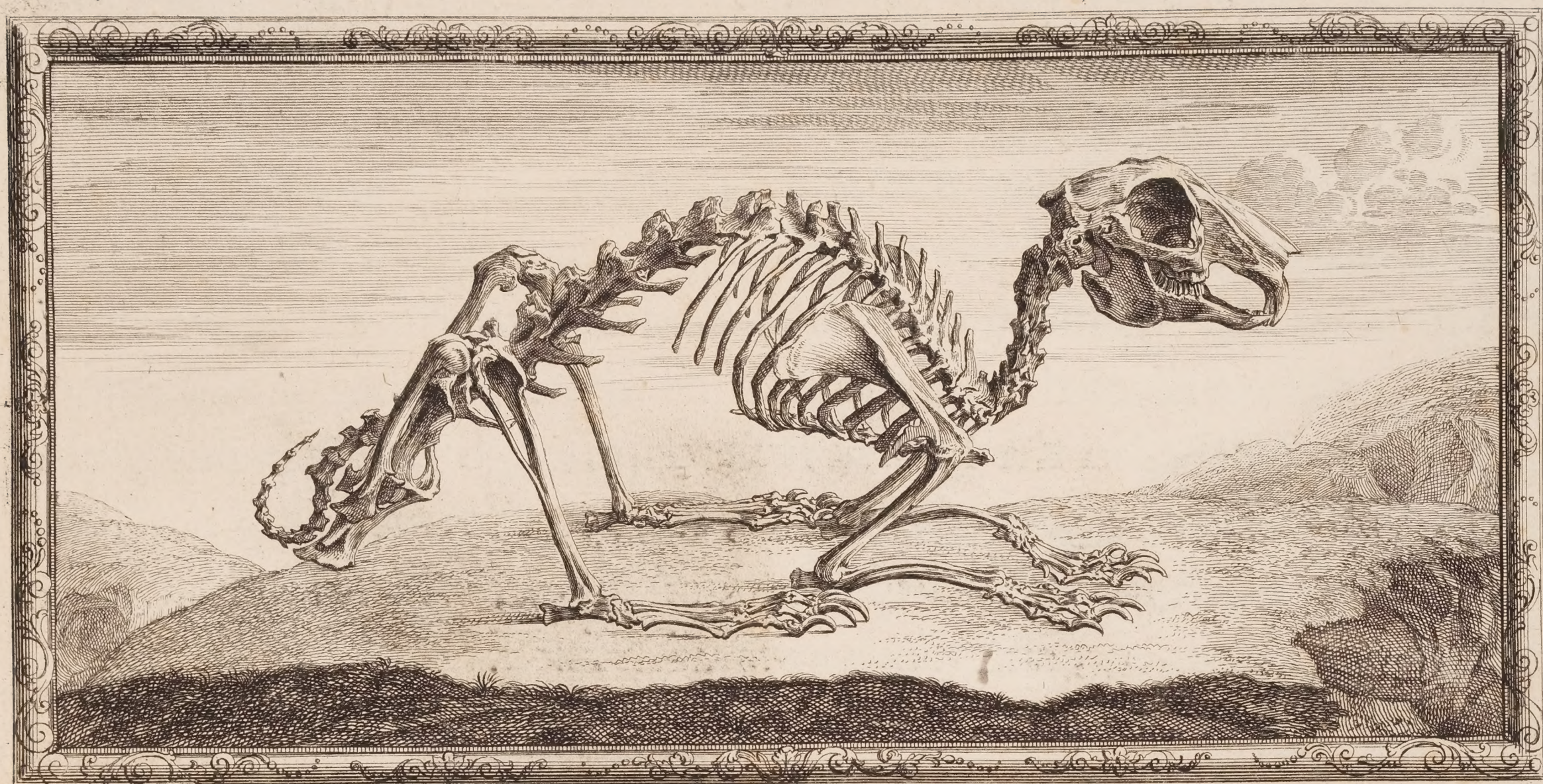
tilages, which join the ribs and sternum, sometimes one cartilage serving two ribs, and sometimes a cartilage not joined to any rib; frequently in old persons we find parts of them ossified, and I have twice found them totally ossified in men between forty and fifty years of age, both of which died with a great difficulty of breathing; and besides, one had a jaundice, and the other a dropsy, but the lungs in both were very sound.

There are seldom found fewer than four and twenty vertebræ in the spine, besides the os sacrum, but often more; sometimes thirteen of the back, with as many ribs of a side; and sometimes six in the loyns: And in some bodies two ribs from the first vertebra of the loyns; but then it has wanted transverse processes.

Os innominatum (Tab. xviii.) is in young persons composed of three bones, the upper is named ilium, the lower and posterior os ischii, and the anterior os pubis; the upper edge of the ilium is called its spine, the anterior part of the spine its apex, and a little lower is the processus innominatus. Ilium has two processes, the one named the obtuse process, and the other the acute; in the center of these bones is the acetabulum or socket for the thigh bone; in the bottom of which socket is another cavity, in which lies the lubricating gland of this joint.







CHAPTER IV.

BONES OF THE UPPER LIMB.



Clavicula (Tab. xxii.) is connected at one end to the sternum with a loose cartilage, and at the other to the processus acromion of the scapula; its chief use is to keep the scapula a sufficient distance from the breast, by which means the shoulders are hindered from coming near together, as they do in those quadrupeds who use their fore limbs only to walk on, and not as men do their hands.

Scapula (Tab. xxii.) is fixed to the sternum by the clavicle, but its chief connection is to the ribs and spine, by those muscles which are made also for its various motions; and in such quadrupeds as have no clavicles it is fixed only by muscles, whose actions give to this bone a great deal of that motion which seems to be in the joint of the shoulder. The under side of this bone is a little concave, partly to fit it to the outer surface of the ribs on which it moves, and partly to give room for the sub-scapularis muscle. On the outside arises a large spine; the fore part of which is called the processus acromion, to which the clavicle is fixed: In men and such quadrupeds as have clavicles, and use their fore limbs like arms, this process and spine are much larger and more prominent, not only for the better fixing the clavicle, but also to remove the muscles farther from

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the center of motion, whereby they are able to move a greater weight. Near this process is another called coracoides, from whose extremity, with like advantage, arise two muscles of the arm; this process with the former, and a flat ligament between them both, hinder the os humeri from being dislocated upwards. The side opposite to the socket is called the basis of the scapula, and the lower edge costa inferior from its figure, which is thick, and like a rib to the scapula; but its upper edge being very thin, is improperly so called in the human skeleton, though not so in many quadrupeds: At the fore part of this edge, close to the coracoid process, is a semicircular notch for the passage of blood vessels, which notch is joined at top with a ligament, and sometimes with bone.

Os humeri: (Tab. xxiii.) Its upper end or head, where it is joined to the scapula, is somewhat flat and much larger than the socket which receives it. At the upper part are two processes for the insertions of muscles of the arm; between these processes is a long chanel, in which lies a tendon of the biceps cubiti. At the lower end are two considerable processes, both formed to give origins to muscles of the wrist and fingers, and the flexors of these joints being much more considerable than the extensors, the inner process from which the flexors arise is therefore much larger than the outer, from which the extensors take their origin: Between these processes is the joint. That part to which the upper end of the radius is fixed is fitted not only for the motion of the elbow, but also for the rotatory motion of the radius; the rest of this joint is made of portions of unequal, but concentric, circles; which inequality seems designed to prevent the ulna from dislocating sideways, which so small a joint with so much motion would be very subject to: Of a like use is the little sinus on the forepart of the humerus, and the large one behind; the first of which receives a process of the ulna when the arm is bent, and the other, the olecranon of the ulna, when the arm is extended.

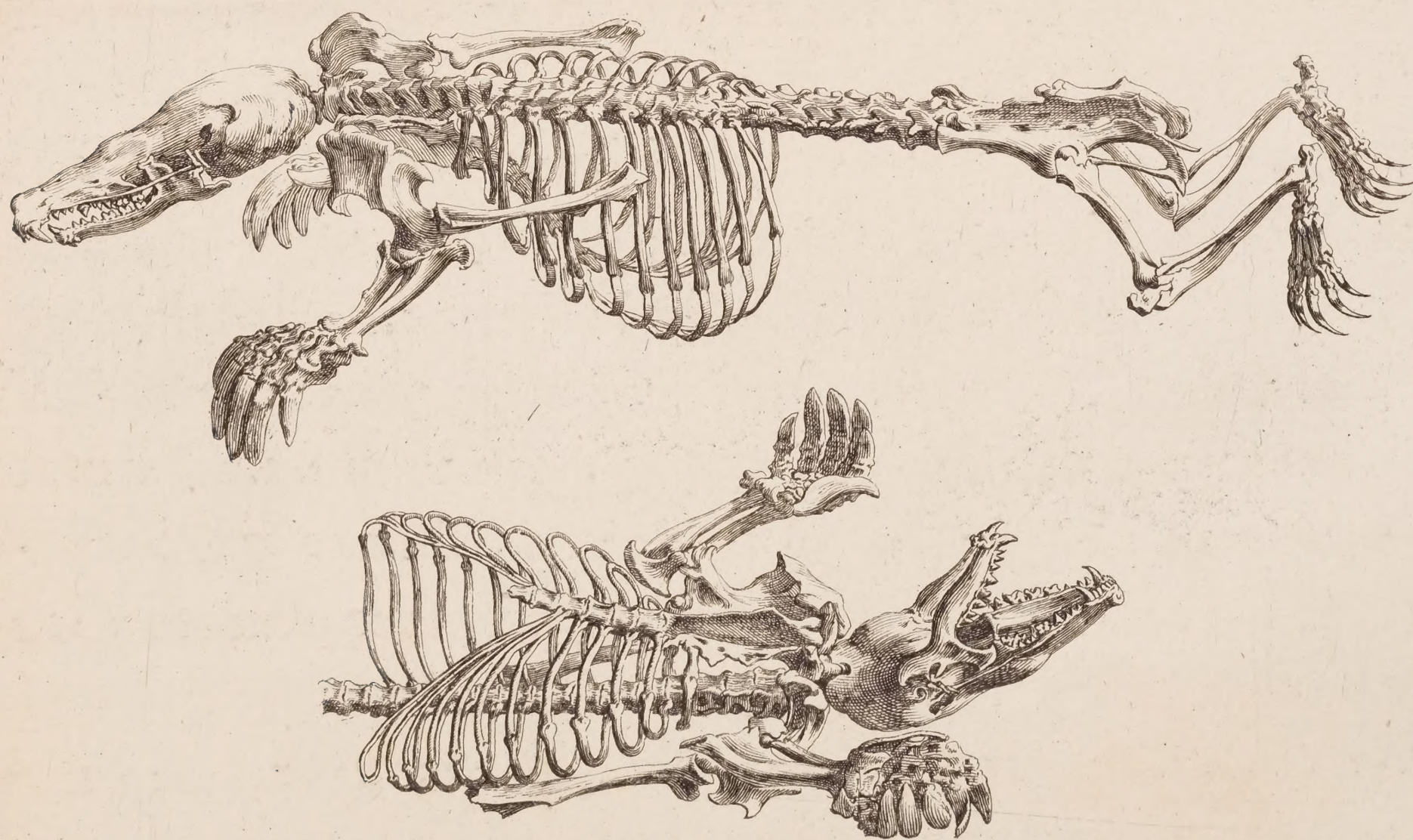
Ulna: (Tab. xxiv.) At the upper end it has one large process called olecranon, and a small process on the forepart; (see the last paragraph.) On one side between these is also a small cavity, which receives the upper end of the radius for its rotatory motion; and down the side of this bone, next the radius, is a sharp edge, from which the ligament arises, which connects these bones together. At the lower end, is a process, called styloformis, and a round head, which is received into the radius for the rotatory motion of the cubit.

Radius: (Tab. xxiii.) Its upper end is received into the ulna, and joined to the humerus, in a manner chiefly fitted for its rotatory motion, for the

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strength of the elbow joint receives but little advantage from the union of these two bones. A little below this head is a large tubercle, into which the biceps muscle is inserted, which by the advantage of this insertion turns the cubit supine, as well as bends it. At the lower end, which is thicker, is a socket to receive the carpus, and at the side next the ulna a small one to receive that bone, and a thin edge, into which the transverse ligament, which arises from the ulna, is inserted. This ligament ties these bones conveniently and firmly together; for the ulna being chiefly articulated to the os humeri, and the radius to the carpus, a weight at the hand without this ligament, would be liable to pull these bones asunder.

Of the bones of the hand. (Tab. xxv.) Carpus is composed of eight bones of very irregular forms, undoubtedly the properest that can be; yet why in these forms, rather than any other, no one has been able to shew. They have all obscure motions one with another, and with those of the metacarpus; but the motion of those of the first rank, or order, with those of the second is more considerable, and are moved by the same muscles which move the carpus on the radius. The metacarpus consists of four bones which sustain the fingers; that of the fore-finger having the least motion, and that of the little one the most: The other ends of these bones have round heads for the articulations of the fingers; but the other joints of the fingers double heads and sockets. The thumb is shorter and stronger than any of the fingers, because in its actions it is to resist them all. The first joint is very singular, each bone equally receiving and being received; but for the shape of these bones, and whatever else relates to them, I must refer to the prints.







CHAPTER V.

BONES OF THE LOWER LIMB.



O S femoris (Tab. xxvii.) at its upper end has a round head, which is received into the socket of the os innominatum. In most quadrupeds this head is oblong, and makes a firmer articulation; but that shape will not allow of so much motion as a rounder head. The two processes near the head are called the greater and lesser trochanters, which are evidently formed for the insertion of muscles, as the neck which lies between these and the head, is formed to make room for that necessary quantity of muscles which are seated on the inside of the thigh, and also by projecting outwards to make long levers for the muscles, which are inserted into its upper and external parts. Between the great trochanter and the neck is a large sinus, into which muscles are inserted; between the two trochanters is a remarkable roughness for the same use, from which begins the linea aspera: The middle of this bone for the convenience of the muscles is bent forwards, which would make it subject to break backwards, if there was not a strong ridge on the back side, which strengthens it sufficiently, and serves also for advantageous insertions for several muscles; this ridge is called the linea aspera. At the lower end of this bone are two large heads called the outer

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and inner apophyses: These are so contrived, partly from being projected backwards, and partly from their shapes, as to remove the centre of motion very far behind the axis of the bone, which gives great power to the muscles that extend this joint to raise the whole weight of the body, though it lessens the power of the benders which move the leg only; between these processes the large vessels descend securely to the leg.

Patella (Tab. xxvii.) is seated at the forepart of the knee; its first appearance is in the center of the tendon, through which it soon extends, until the tendinous fibres are lost, and appear to be converted into bone; however, when this bone is broke, the original tendinous fibres seem to prevail, seeing the broken parts, unlike all other bones when fractured, unite with a tendon-like substance, which is rarely converted into bone, and especially in those cases, where the joint recovers with most motion; its use is to secure the extensors of the tibia, lest passing over the joint, they might be too much exposed to external injuries; it also encreases the advantage (mentioned in the last paragraph) of removing the common axis of the extensors of the tibia farther from the centre of motion, and is a most convenient medium for those muscles to unite in, to perform one common action.

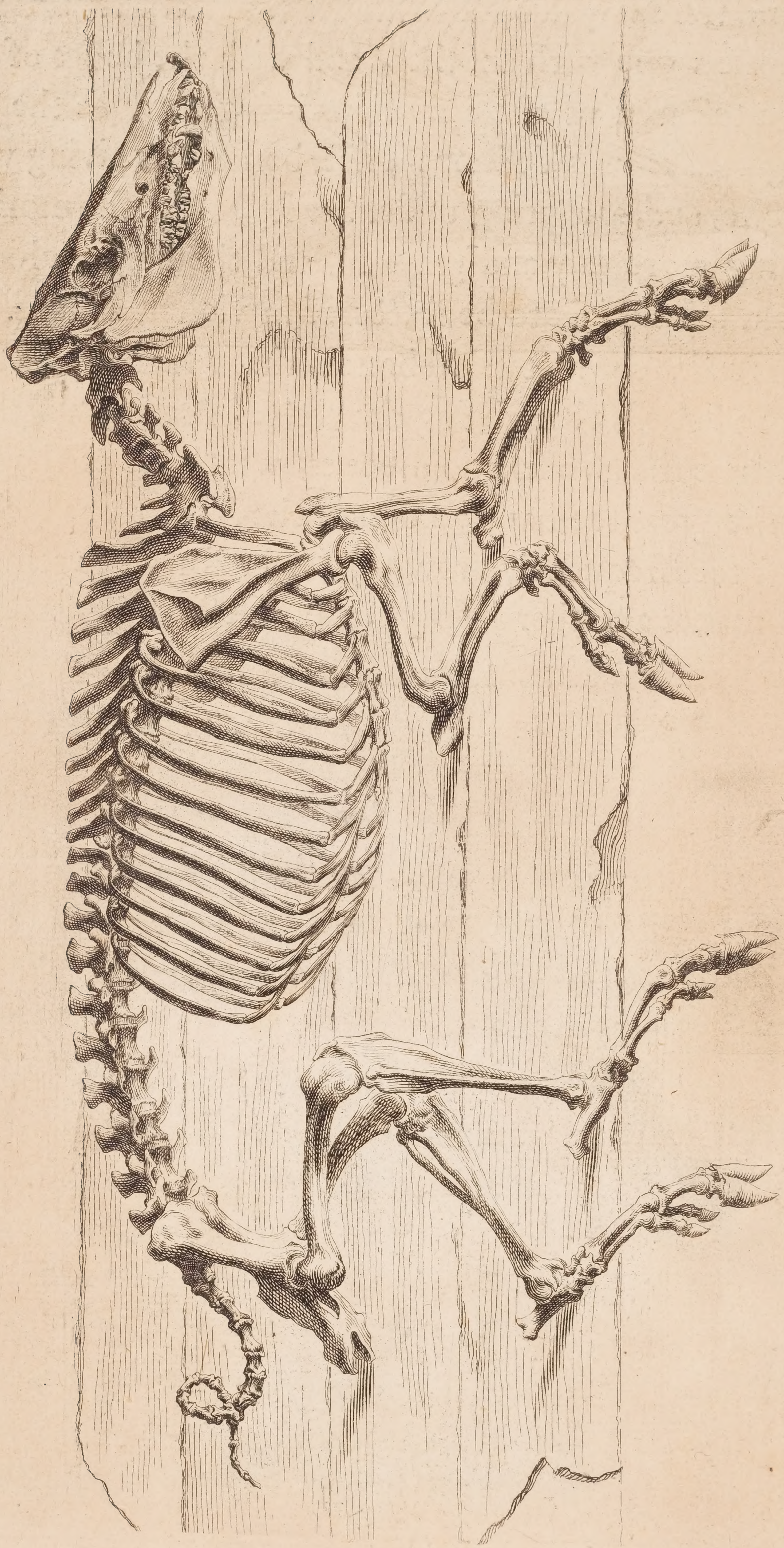
Tibia, (Tab. xxviii.) the shin bone, is large at its upper end, where are two shallow sockets which receive the thigh bone; between these is a rough process, to which the cross ligaments of this joint are connected. Near the upper end is a process, into which the ligament or tendon of the patella is inserted, and at the lower end is a process, which makes the inner ankle, and secures this bone from dislocating outwards: Towards the upper end this bone is triangular, and even concave on the side next the muscles to make room for them; but lower, as the muscles grow less and tendinous, the bone grows rounder; that being upon the whole a stronger form: It is not made so strong as the thigh bone, though it bears a greater weight, which it is able to do by being freighter, and bearing the weight of the body in a more perpendicular direction.

Fibula (Tab. xxviii.) is seated on the outside of the tibia; its upper end is joined to that bone below the joint of the knee, and its lower end is received into a shallow sinus of the same bone, and below that makes the externa langle; which process, with the process of the tibia, strengthens the ankle joint, which nevertheless being so small would have been not strong enough, if it had been made for more motion. It is doubtful to me, whether or not this bone contributes to the support of the body; but its great use is for the origins of muscles, and even its shape is suited to theirs.

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Of the bones of the foot. (Tab. xxix.) Tarsus is composed of seven bones, the first of which, called astragalus, supports the tibia, and is supported by the os calcis, which being projected backwards makes a long lever for the muscles to act with that extend the ankle, and raise the body upon the toes. These two bones have a considerable motion between themselves, and the astragalus also with the os naviculare, and all the rest an obscure motion one with another, and with the bones of the metatarsus, the greatest part of these motions being towards the great toe, where is the greatest stress of action: These bones thus giving way are less liable to be broke, and, as a spring under the leg, make the motions of the body in walking more easy and graceful, and the bones which are supported by them less subject to be fractured in violent actions. To these join five others called the metatarsal bones; that which supports the great toe is much the largest, there being the greatest stress in walking; under the end of this lie the two sesamoid bones, which are of the same use as the patella; the great toe has two bones, the lesser three each, the two last of the least toes frequently grow together; for what remains see the plate, which makes a farther description needless.







CHAPTER VI.

CARTILAGES, LIGAMENTS, &c.



Very part of a bone which is articulated to another bone for motion, is covered or lined with a cartilage, as far as it moves upon, or is moved upon by another bone in any action; for cartilage being smoother and softer than bone, it renders the motions more easy than they would have been, and prevents the bones wearing each other in their actions.

In each articulation of the lower jaw, (Tab. xxxviii.) there is a loose cartilage, upon which the condyloid process moves on one side, while the jaw is moved to the other; and the two processes being thus raised at once, the jaw is thrust forward. These cartilages are also found in animals that chew the cud, but not in beasts of prey, as far as I have examined, their articulations being also deeper and firmer; and in the otter particularly, sections of the sockets which receive the condyloid processes of the lower jaw, are more than half circles; so that the jaw cannot be dislocated directly without breaking the sockets. This structure renders the motions of the jaw more firm, as that with intervening cartilages makes it more loose and voluble. There are also cartilages of this kind between the clavicles and the sternum.

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In the joint of the knee (Tab. xl.) are two loose, almost annular cartilages, which being thick at their outer edges, and thin at their inner ones, they make the greatest parts of the two sockets in this joint. The use of these cartilages is to make variable sockets to suit the different parts of the lower end of the os femoris; for none but a round head and a round cavity can suit in motion, unless the shape of one or the other alters; and it is plainly necessary, that this lower end of the os femoris should be flattish, and projected backward, to give advantage to the muscles that extend the tibia, by setting the center of motion backward; which mechanism, though it equally lessens the power of those muscles which bend this joint, is yet of great service, because the extending muscles move this joint under the weight of the whole body, but the flexors only raise the legs; and as no head or socket moves so easily as round ones, here seems to be some provision made against the inconvenience of a flattish head and cavity, by having the friction made upon two surfaces, the os femoris upon the loose cartilages, and the loose cartilages upon the tibia. This contrivance is imitated by mechanicks, where the friction of the joints of any of their machines is great, as between the parts of hook-hinges of heavy gates, and between the male and female screws of large vices, where they usually place a loose ring.

There are other cartilages which serve to give shape to parts. Of this sort are the ciliary cartilages at the edges of the eye-lids, the cartilages of the outer ears, and those which compose the lower part of the nose, which have this particular advantage in these places, that they support and shape the parts as well as bones do, and without being liable to be broke; and to these might be added those of the larynx, but they do not belong properly to the skeleton.

Of the ligaments. Bones that are articulated for motion are tied together by ligaments, to prevent their dislocating, which also surround the joints to contain their lubricating mucus. The thickness and strength of these ligaments are proportioned to the actions of the several joints, and their lengths are no more than sufficient to allow a proper quantity of motion; but the forms of them are different according to the different actions of the several joints.

The bones of the limbs that move to all sides have ligaments like purses, which arise from or near the edges of the sockets of the receiving bones, and are inserted all round the received bones a little below their heads. The beginnings of these ligaments, from the edges of the sockets of the scapula and os innominatum are very hard, almost cartilaginous,

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which serves in the scapula to make a larger socket, and such a one as will alter its figure as the bone moves, for the reason I have mentioned in the loose cartilages of the knee; for the head of the os humeri, not being an exact portion of a sphere, requires such a socket, and the hard part of this ligament of the socket of the os innominatum makes the socket deeper than the semidiameter of the socket, by which means the articulation is made stronger without any hindrance to motion, because it will give way to the neck of the os femoris when it presses against it; and the thigh bone being more disposed to be dislocated upwards than any other way, the upper side of this bursal ligament is made exceeding strong to prevent such an accident. From the lower edge of the acetabulum or socket of the os innominatum arises a ligament about an inch long called teres, or rotundum, (Tab. xxxix.) which length is necessary for that quantity of motion which this joint has in human bodies; it also hinders the os femoris from dislocating upwards, but downwards it will suffer it to go far out of the socket; but in brutes the head of the os femoris being oblong, and the cavity suitable, there can be only a rotatory motion, which in the effect will be very little more than that kind of motion which is called bending and extending; and this never removing the end of the head of the bone far in the socket, a short ligament is enough for it, and will better keep the bone in its place; and therefore it is that theirs is so short. This ligament in men may also serve to press the gland in the bottom of the acetabulum or socket.

The ligaments of those joints which admit only of flexion and extension, differ from the former in this, that they are much shorter and stronger at the sides of the joints, and thinner backward and forward. Besides these ligaments in the middle and back-part of the joint of the knee (Tab. xl.) are two very strong ligaments which arise from a process at the end of the tibia. They cross each other in such a manner, as is best to secure the joint from being displaced any way; they also hinder the extensors of the tibia from pulling that bone too far forwards, and are so connected to the femilunar cartilages, as to move them as the joint moves; besides these in this joint is another small one, which arises from the os femoris, and ends in the fatty membrane which it supports.

The bones of the carpus and tarsus (Tab. xxxviii. xl.) are tied together by ligaments running promiscuously upon their surfaces from one to another; which at the under side of the tarsus are vastly strong, because they support the whole body; these ligaments together contain the mucus for all those joints. There is also to the carpus a strong ligament which runs

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from the fifth bone to the eighth, and the process of the fourth bone: the proper use of this is, to bind down the tendons of the muscles that bend the fingers.

The processus dentatus of the second vertebra (Tab. xxxviii.) is tied to the scull by a ligament, and kept close to the forepart of the first vertebra by another in that vertebra, that it may not bruise the spinal marrow; and when either this ligament or process is broke, it makes that sort of broken neck which is attended with sudden death. All the bones of the vertebræ, and every joint that is without motion, and not joined by a suture, as the ossa innominata with each other, and the os sacrum with the ossa innominata, are joined by intervening ligaments, or (as they are commonly called) cartilages. The ossa innominata are also tied by very strong ligaments which run from the back parts of the spines of the ossa ilia to the os sacrum, (Tab. xxxix.) and other ligaments which go from the os sacrum and os coccygis to the acute and obtuse processes of the ossa ischia: these ligaments serve also for origins of muscles. Towards the great foramen of the ossa innominata the acetabulum has a deep notch, from the one side to the other of which runs a ligament which compleats the socket; this ligament is sometimes ossified: a ligament somewhat like this, there is between the processes of the scapula.

From the edge of the ilium to that of the os pubis, runs a ligament which is contiguous to, and appears to be a part of the tendons of the muscles of the abdomen; its use is to cover the iliack vessels as they descend to the thigh: under this ligament, together with the vessels, I have often seen a rupture of matter, and, I think, sometimes of the gut, from the abdomen into the anterior part of the thigh, immediately below the groin; however, I dare affirm this to be a possible case.

It is generally agreed, that the ligaments are insensible; and the reason assigned is, that they would else be injured by ordinary motions. But they are much better contrived, seeing none of them, not even those which lie between the vertebræ, are subject to attrition; but the other experience shews are capable of very acute pains, there being not any thing our patients more grievously complain of, than collections of matter within these parts, or sharp medicines applied to them when laid bare.

Every joint, where the bones are faced with a cartilage for a sliding motion, is furnished with small glands, which separate a mucilaginous matter for the lubricating of the ends of the bones, that they may move easily upon one another; and that there may be no waste of this necessary fluid, it is contained in the investing ligaments; which for this very reason

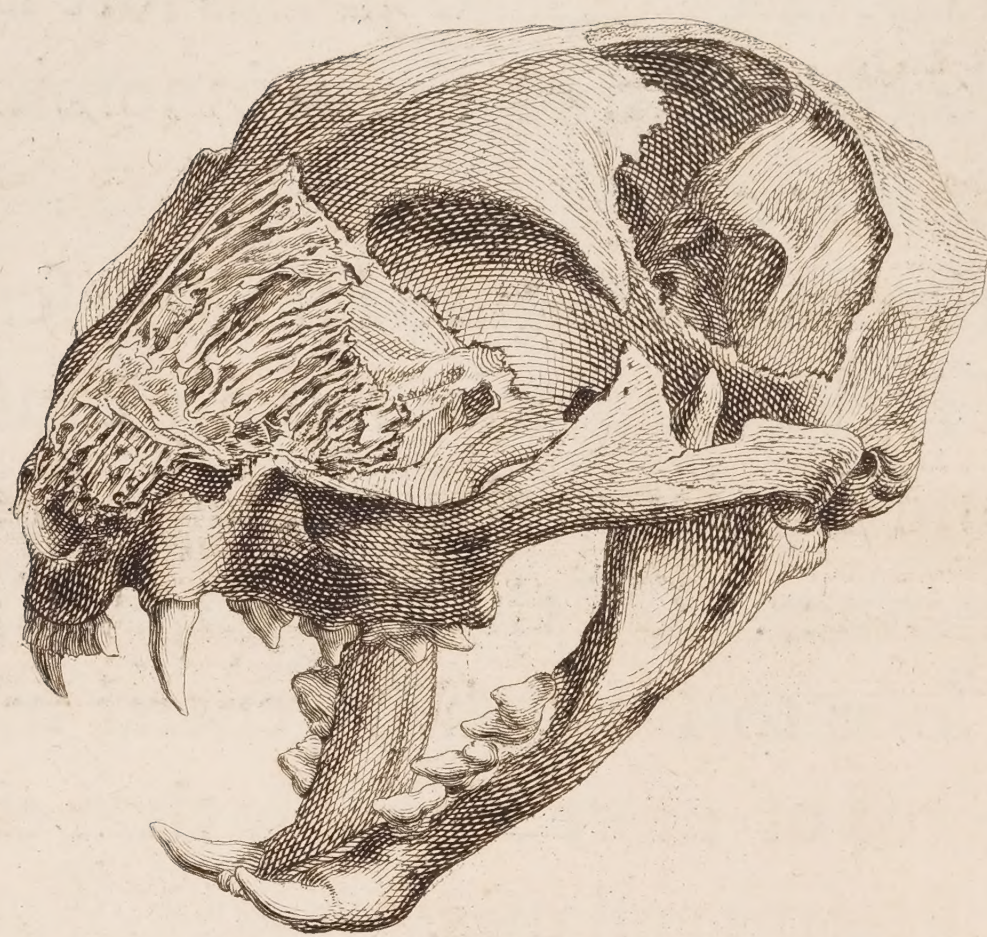
CHAPTER VI.

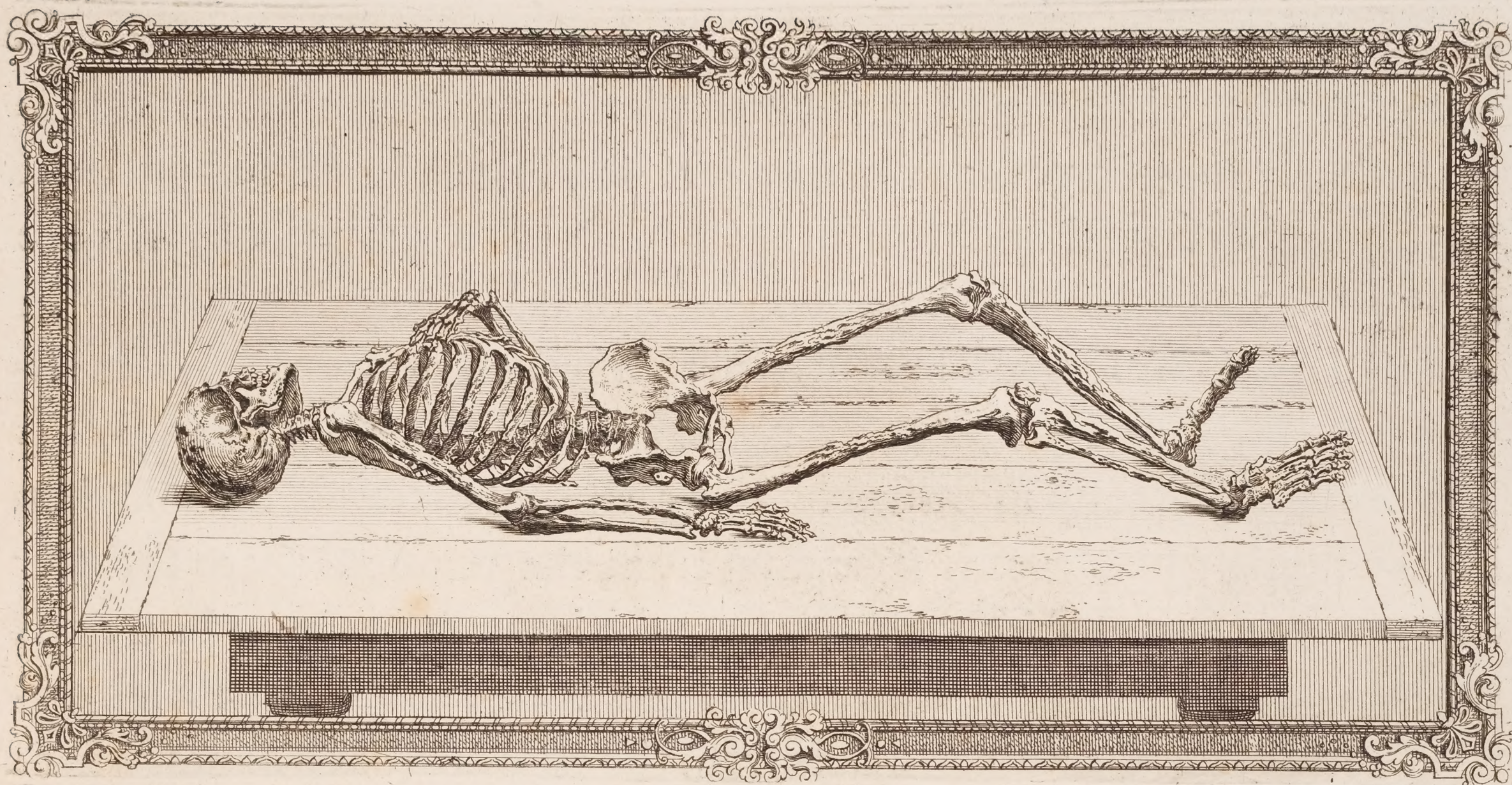
are no where divided, except to communicate with the ligaments of tendons.

These glands are generally seated in a little fat near the insertion of the ligaments, that they may be compressed by them when the joints are in motion; which is a proper time to have their fluid pressed out. The most considerable parcel of these glands with their fat, are seen in the joint of the knee, and the largest gland of this sort is found in the sinus at the bottom of the acetabulum of the os innominatum, and is compressed by the ligamentum teres.

This work being principally designed for the description of the bones, and the parts treated of in this chapter being only considered as they relate to their connections and motions, the cartilages are therefore only described in a general manner. Of the ligaments, the most considerable only are mentioned, so as to shew their general mechanisms and uses, and the glands are treated of more sparingly than either, there being in them yet less variety of forms and uses.







CHAPTER VII.

OF DISEASED BONES.



It is not the design of this chapter to enter minutely into all the diseases of the bones mentioned by authors, but in a general manner so far only as relates to their cure, or to such extraordinary diseased bones as I have made prints of in this work.

The bones are subject to diseases from all the same causes that the other parts are, but either from their hardness, insensibility, or other causes, they neither are so frequently diseased, nor do their diseases appear so various, and it is generally of more consequence what texture the diseased bone, or part of the bone is of than from what cause that disease proceeded; for when diseases happen upon the surfaces of the hard bones, they usually admit a cure by exfoliation; but when matter is made in the spongy ends of the cylindrical bones, or in the bodies of other spongy bones, the matter whatever was the first cause insinuates it self through those spongy cells, swelling the bone, and making generally an incurable caries; but if the matter is corrosive, it often ulcerates these parts (Tab. xlix. Fig. v.) and usually makes so large a discharge as to destroy the patient where the part diseased cannot be extirpated, which is often the case when matter is made in the bones in scrophulous habits.

CHAPTER VII.

The venereal disease (Tab. xli. xlii. xlvi) rarely attacks any but the hardest parts of the bones, very soon raising large tumours and caries or mortification; but these caries parts of bones from this or other causes are but partially mortified, for were they perfectly so, the sound and unsound parts would separate though the integuments were not taken off; whence it happens, that where there is a good habit of body caries bones are often endured many years without much inconvenience, and we find from experience that such separations are not to be made till the diseased part is laid bare and perfectly mortified by being exposed to the air, &c. and then the sound part underneath separating from the unsound there first granulates a fungous fleshlike appearance, which ought never to be treated with corrosive medicines, it constantly shrinking and hardening of it self, being the same substance which shoots from the ends of broken bones, where also it soon shrinks and converts into a callous to reunite them.

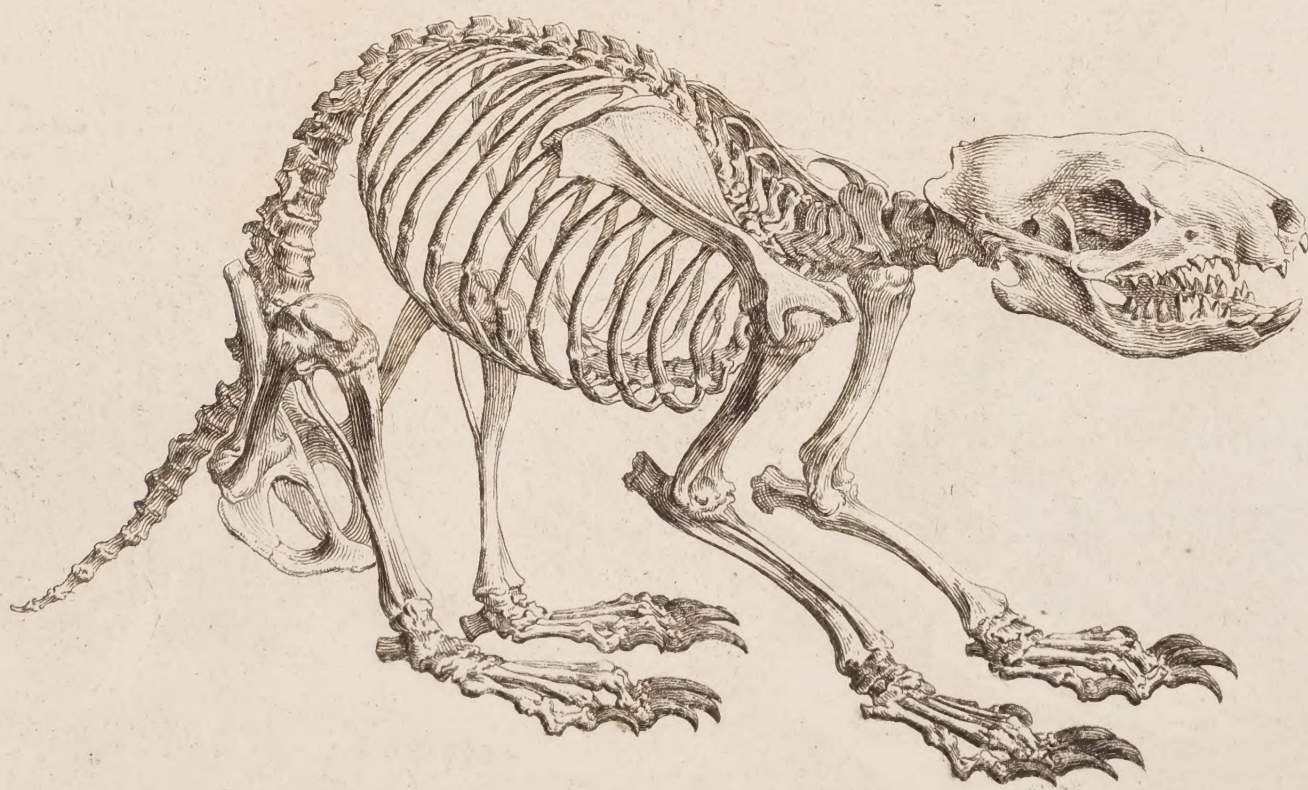
There is a caries distinct from these, which I have only seen in two patients who died after a long rheumatic disorder, in which the outer surface of all the hardest bones as the middle of the cylindrical bones and the top of the scull, in one which I boiled, and in the other as far as I was allowed to examine I found the outer part every where crumbly or scaly, falling into pieces like dust or sand, with very little appearance of tumour any where, and no appearance of disease in the spongy parts.

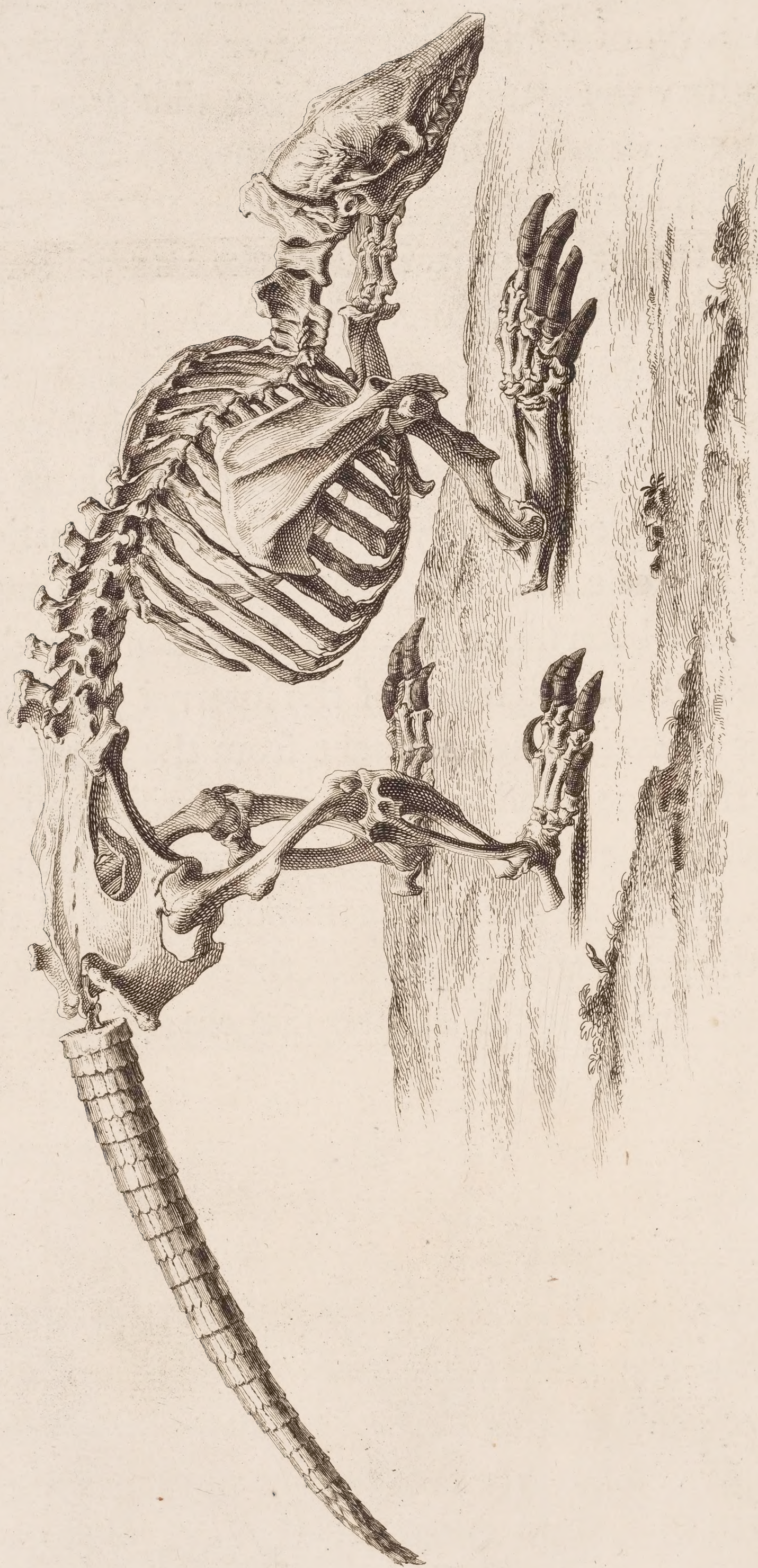
The diseases of the joints either happen from ulcers in the lubricating, glands which pouring out matter that cannot be discharged, fouls the ends of the bones, or else from swellings in the ends of the respective bones, either of these in time create excessive pain, which appears to me to be chiefly in the ligaments of the joints, notwithstanding what has been said of the insensibility of these parts by authors. When a joint is much swelled, in these cases it is vulgarly called a white swelling, and more properly than *spina vertosa*; and whatever may be done (of which I never dare promise much) when once the limb wastes, and the fingers or toes of the limb grow thinner at their joints, lose their shape, and are what a painter would call out of drawing, the case then is absolutely irrecoverable. Sometimes in these cases the ends of the bones erode, then join together and form an ankylosis (Tab. xlvii. li.) which though a bad disease of it self, yet it is often a remedy of this disease, which is much worse: In like manner the bones of the hands and feet (Tab. liv.) when they are ulcerated sometimes unite and are thus preserved from total ruin. But there is one case of a white swelling that is amazing, where the pain is so great that we are forced to take off the limb, and yet neither perceive the

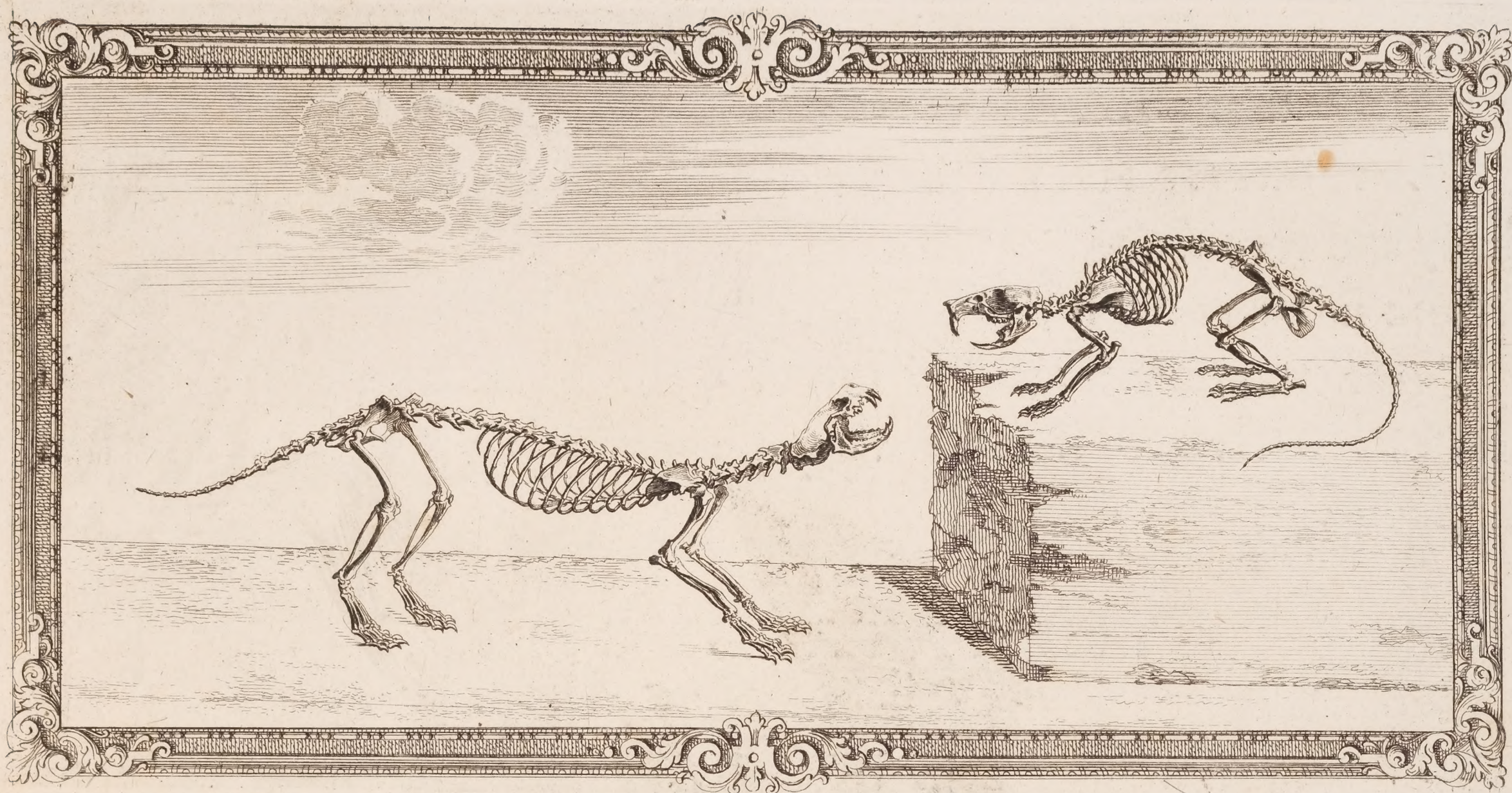
CHAPTER VII.

ligaments or glands diseased, nor matter in the joynt, nor the bones caries, or any diseased appearance, except that the ends of the bones are a little larger and softer.

Not only these parts but even the large medullary cavities of the cylindrical bones have sometimes matter formed in them (Tab. xlix.) which constantly increasing and wanting vent, will partly by corroding and rendering the bone carious, and partly by pressure tear asunder the strongest bone in an human body, of which I have known several instances (Tab. xlix.) in one case where the matter had sufficient discharge by an external caries formed together with the internal one, all the internal hard part of the bone which contains the medulla was separated from the rest, and being drawn out through the place where the external caries made a vent, the patient received a perfect cure. (Tab. xlix.) Another case of this kind, where the internal part which contains the medulla was also separated from the rest, and there being holes through which the matter was discharged, but none sufficient to take out the exfoliated bone; the matter continued to flow in great quantity till it destroyed the patient; (Tab. lv.) and possibly if this case had been rightly known, the internal exfoliated part might have been taken out, and the patient cured: In both these cases it seems as if only so much of the internal part of the bone was become carious as receives nourishment from the artery which enters the middle of the bone; and as a caries is a mortification of a bone, might not this disease arise from a hurt in the vessel which nourishes that particular part. These are the most common diseases of the bones; others described in the prints and explained in the references, would have been treated of more largely in this chapter if there had been room.







CHAPTER VIII.

COMPARATIVE SKELETONS &c



THE FRONTICE-PIECE represents Galen contemplating the skeleton of a robber, who being killed by a traveller had his bones picked in two days by vultures: This opportunity he mentions as a piece of good fortune, though he had seen another skeleton which was accidentally washed out of a burying place, by the overflowing of a river; besides one which was shewn in a public school at Alexandria, which he thought was worth the trouble of any one to go on purpose to study.

THE PRINT IN THE TITLE PAGE represents the camera obscura, with the manner of using it: About six inches within that end where the draftsman sits, is fixed the table glass, upon the rough side of which he draws with a black-lead pencil, which he afterwards traces off upon paper; towards the other end, in a sliding frame, is put the object-glass, which being moved backward or forward, makes the picture bigger or less, and the inside of the case is made black to prevent reflections of light.

THE NEXT PRINT is the QUEENS arms set upon a pedestal; on which is represented in bass relieve, arts and sciences flourishing under HER MAJESTIES protection.

COMPARATIVE SKELETONS &c.

TO THE READER.

THE FRONTICE-PIECE is the skeleton of a young buck, stopping suddenly and turning.

THE HEAD-PIECE is the skeleton of a dog as he lies sleeping.

THE TAIL-PIECE is the skeleton of a thornback a little dried, and so carefully performed, that there is not one rib or joynt more or less than in the life.

THE INTRODUCTION.

THE FRONTICE-PIECE is the skeleton of a monkey, sitting on the stump of a tree.

THE HEAD-PIECE represents the three famous skeletons in Vesalius, so justly admired for their attitude, and the great taste in which they are drawn. The artist has designed these in their general outlines, not in the proportions of skeletons, but of whole human figures, consequently much too broad for their heights; which, though productive of many errors in particular parts, I am inclined to think, that to those who have not been conversant with skeletons, they look much the better for it. The first stands on one side of the monument, and leans on the other, which must be the diameter of the whole monument out of the upright; and all of them are drawn from skeletons whose bones were very ill put together.

THE TAIL-PIECE is the skeleton of a crane, with the skeleton of a fish: This kind of birds living on fish, their legs are made very long to stand in waters, and the whole skeleton as light as may be, they having no great occasion for strength.

CHAPTER I.

THE FRONTICE-PIECE is the bones of the head of a man-tyger.

THE HEAD-PIECE is the bones of the head of a bull, the grinding tooth of an elephant, and the bones of the head of a sea-horse, all done to the same scale. Here in one view may be seen the different perfections of the two gravers.

THE TAIL-PIECE is the scull and horns of a ram.

COMPARATIVE SKELETONS &c.

CHAPTER II.

THE FRONTICE-PIECE: The uppermost figure is the bones of the head of a pike; which being loosely connected, and the lower jaw composed with an additional bone on each side, like the jaw of a viper, their jaws are thereby capable of being vastly extended when they swallow their prey, which they do whole, and oftentimes things of greater diameter than themselves. The rest of these figures are bones of fish from the West Indies: The first are the upper and lower jaw of a fish remarkable for the number and shape of its teeth; the next on the left hand is an upper jaw of a fish with teeth in the roof of the mouth, and in the lower jaw are rows of teeth one below another: The other figures are the upper and half a lower jaw and the tongue of another fish, all as it were studded with hard bones to grind their food.

THE HEAD-PIECE is the skeleton of a cat frightened, at the skeleton of a dog.

THE TAIL-PIECE is the skeleton of a lizard, which is a perfect mixture of the serpentine kind and quadrupede.

CHAPTER III.

THE FRONTICE-PIECE is the skeleton of a water tortoise laid upon its back.

THE HEAD-PIECE is the skeleton of a crocodile.

THE TAIL-PIECE is the skeleton of an eagle, or a bird of that kind; this bird is every where formed for strength: before it, is the skeleton of a viper, in which every single rib and bone is expressed.

CHAPTER IIII.

THE FRONTICE-PIECE is the skeleton of a bear, in which is remarkable the great strength of the jaws, and the neck, and the fore feet, and the shortness of the uppermost ribs, which makes them strong for their fore feet to gripe any thing against. This skeleton being put together with stiff wires, I could not alter it into a properer posture.

THE HEAD-PIECE is the skeleton of a rabbit whose bones are so constructed as to bring the hind feet easily under the center of gravity of the whole body, while they scratch their holes; and for this reason the fore

COMPARATIVE SKELETONS &c.

feet are bent for the earth to pass easily underneath them; the breast is also concave for the same purpose, and the hind legs stand wide for the earth to be thrown between them, and their jaws are particularly constructed for their feeding on the bark of trees, as well as on grass.

THE TAIL-PIECE represents a mole in two views, to shew the vast strength of the fore feet for digging; the slenderness of the head, the back bones with small processes, and the posture of their hind legs, all contrived for their passing easily along the holes they dig.

CHAPTER V.

THE FRONTICE-PIECE is the skeleton of an ostrich, which is a bird made for walking, therefore the ossa innominata and bones of the legs are made exceeding strong, and when standing straight (unlike other birds) almost under the center of gravity; the wings are small, but nevertheless very useful when they run fast or leap.

THE HEAD-PIECE is the skeleton of a sparrow; and the skeleton of a bat, which though it flies like a bird, has the body of a quadrupede; it hangs by two little hooks, which nature has provided for that purpose.

THE TAIL-PIECE is the skeleton of a swan, one of the finest of the swimming birds: The body is made broad for floating, and the legs which are their oars, are formed to push advantageously backwards.

CHAPTER VI.

THE FRONTICE-PIECE is the skeleton of an hog laid upon boards.

THE HEAD-PIECE is the skeleton of a camelion standing as they usually do in trees, where they live by catching flies, and for their drink they thrust forward their lower jaw, and receive the drops of dew that fall down their foreheads.

THE TAIL-PIECE is the skeleton of a squirrel; its fore teeth are formed for biting nut-shells, like the teeth of rats and rabbits; and like the bear and monkey has its fore limbs stronger than the hind.

CHAPTER VII.

THE FRONTICE-PIECE: The uppermost figure is the bones of the head of a cat, prepared to shew the lamellæ in the nose for the membranes to be spread upon for the sense of smelling, and part of the scull is taken

COMPARATIVE SKELETONS &c.

off to shew the process that separates the cerebrum from the cerebellum, which is of bone only in such rapacious animals. The lower figure is the end of a boar's jaw, in which one of the teeth is grown quite round and through the jaw again.

THE HEAD-PIECE is a pocky skeleton, in which there is scarce one sound bone.

THE TAIL-PIECE is the skeleton of an hedgehog remarkably made for folding his body round; the action here represented is that when he begins to unfold himself.

CHAPTER VIII.

THE FRONTICE-PIECE is the skeleton of an armadilla, a slow and strong animal, covered with a very thick hard scaly skin for its defence, part of which is left upon the tail of this skeleton.

THE HEAD-PIECE is the skeleton of a weasel, and of a rat.

THE TAIL-PIECE is the skeleton of a frog.

THE LAST PLATE represents a broken obelisk, and upon its base is the skeleton of Hercules resting from his labours.

THE TEN INITIAL LETTERS can need no explanation, they being designed to suit the several chapters; there are fifty six folio plates of human osteography, one set unlettered to shew them in their full beauty, and one set lettered for explanations, and of plates for ornament forty four including the initial letters.

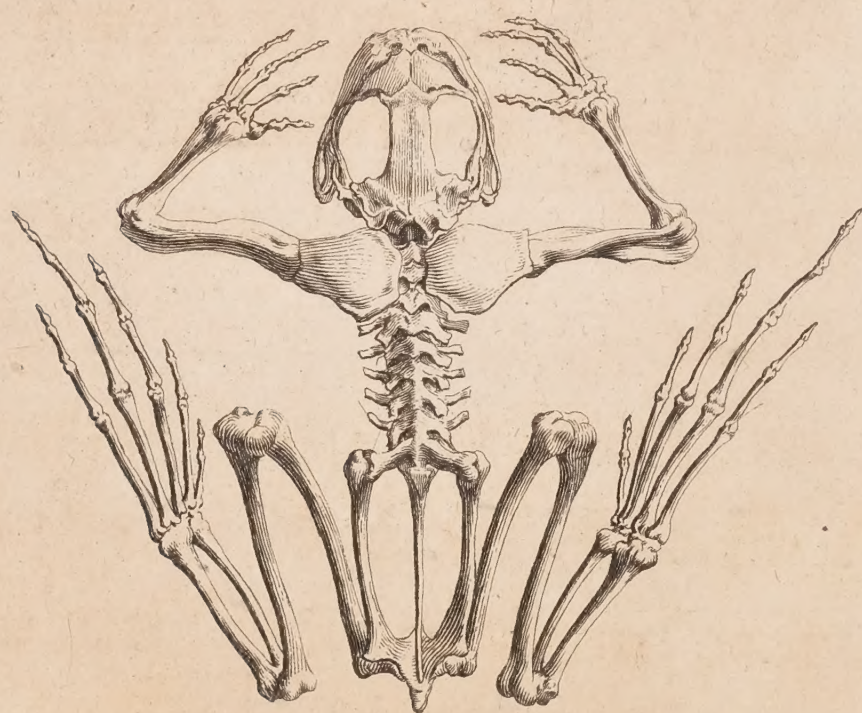


TABLE I.

FIG. I.

HALF the os frontis of an abortive human foetus, magnified about four times its natural diameter: Communicated to me by Dr. *Nichols*.

A *The edge of the orbit of the eye.*

B *Part of the orbit.*

CC *Some detached ossifications.*

FIG. II.

THE os parietale of an human foetus, in which the bony fibres seem to proceed from the center.

FIG. III.

PART of the last bone viewed in a microscope.

FIG. IIII.

A BIT of an os femoris.

AB *The periosteum full of blood vessels.*

FIG. V.

A BONE taken out of the middle of an human heart.

FIG. VI. FIG. VII.

THE hand and foot of an human foetus, in which the cartilaginous parts being shrunk and dried, have lost their shape.

FIG. VIII.

THE scapula of a foetus.

A *The acetabulum.*

B *The end of the processus coracoides.*

C *The end of the acromion.*

D *A part of the basis of processus coracoides.*

EEF *The basis of the scapula: All these parts are cartilaginous.*

FIG. IX.

THE os innominatum.

AA *The upper edge of the ilium.*

BB. *A space between the three bones.*

CC *The edge of the os ischium and pubis: all cartilaginous.*

D *The place where the os sacrum joins.*

FIG. X.

THE os femoris cut open.

AAAA *The cartilaginous parts at the ends of the bone.*

B *The medullary cavity.*

CCCC *The spongy cells.*

I

FIG I

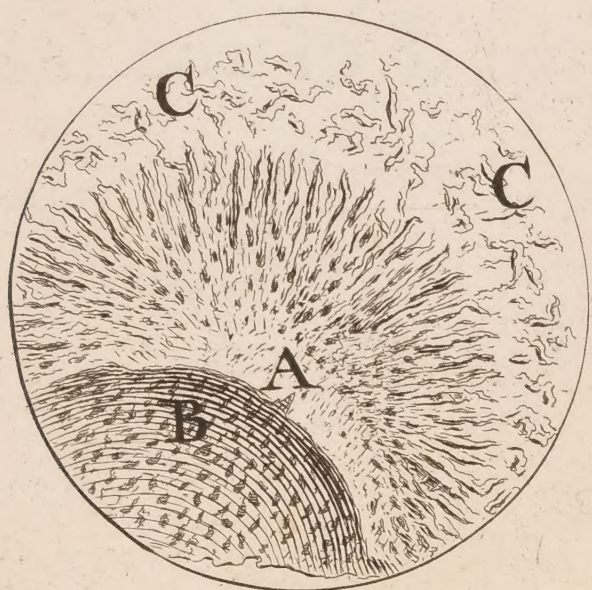


FIG III

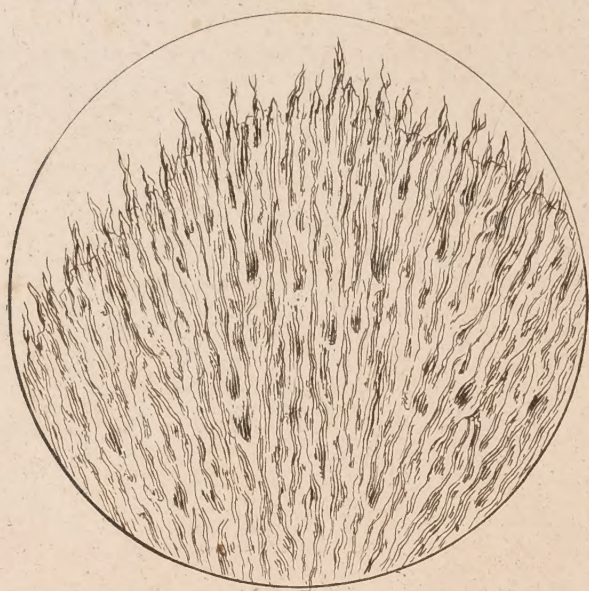


FIG IIII

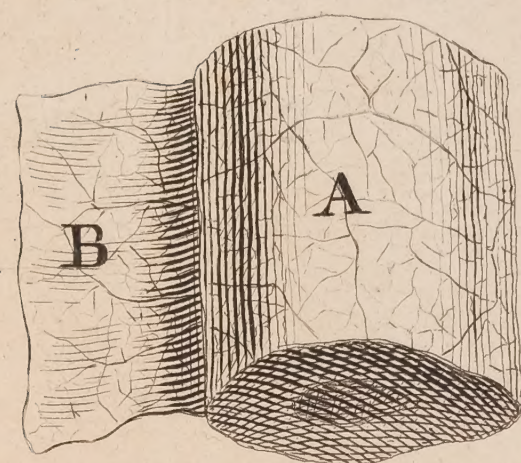


FIG II

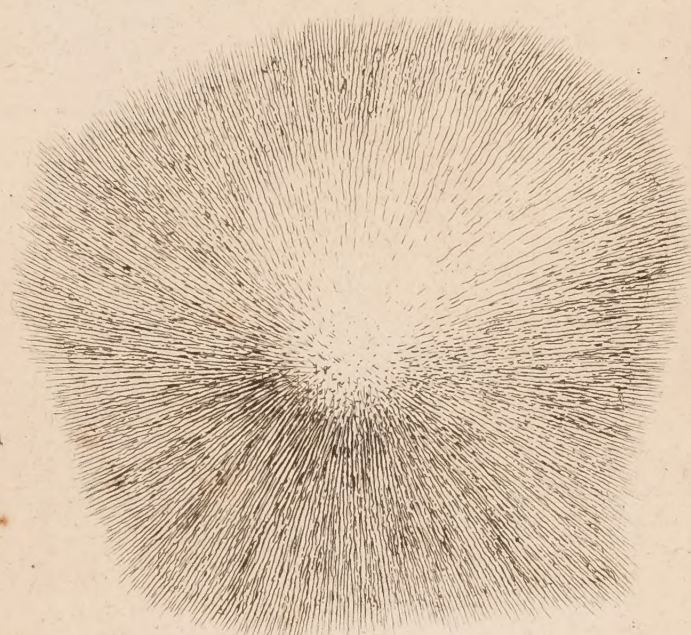


FIG VI



FIG V



FIG VII



FIG VIII

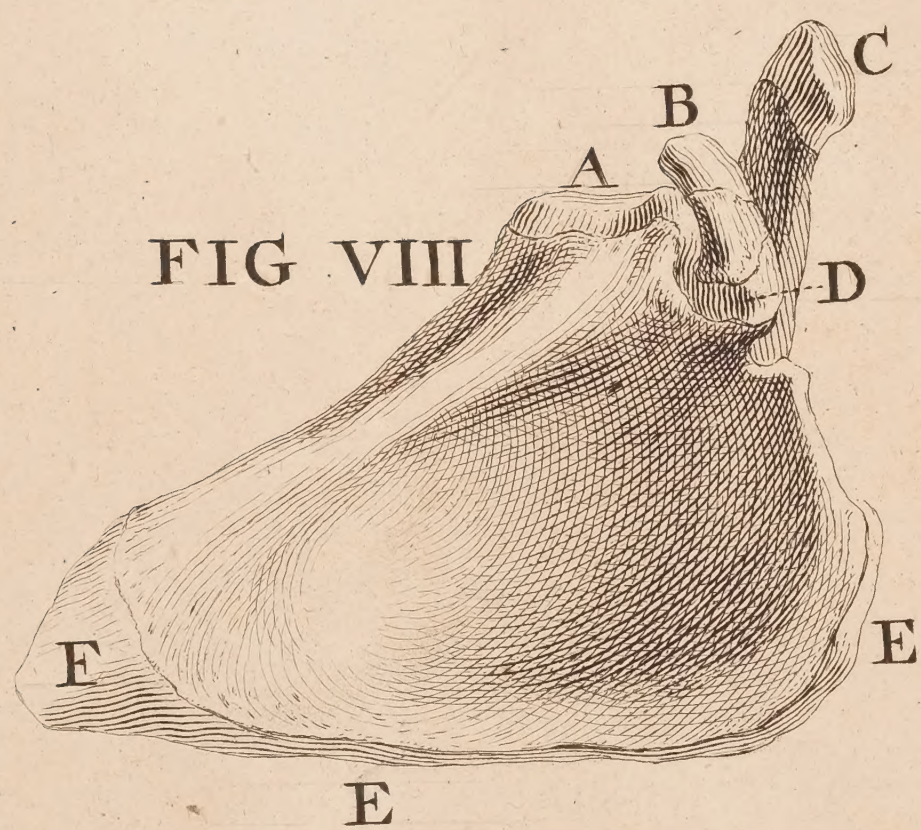


FIG X

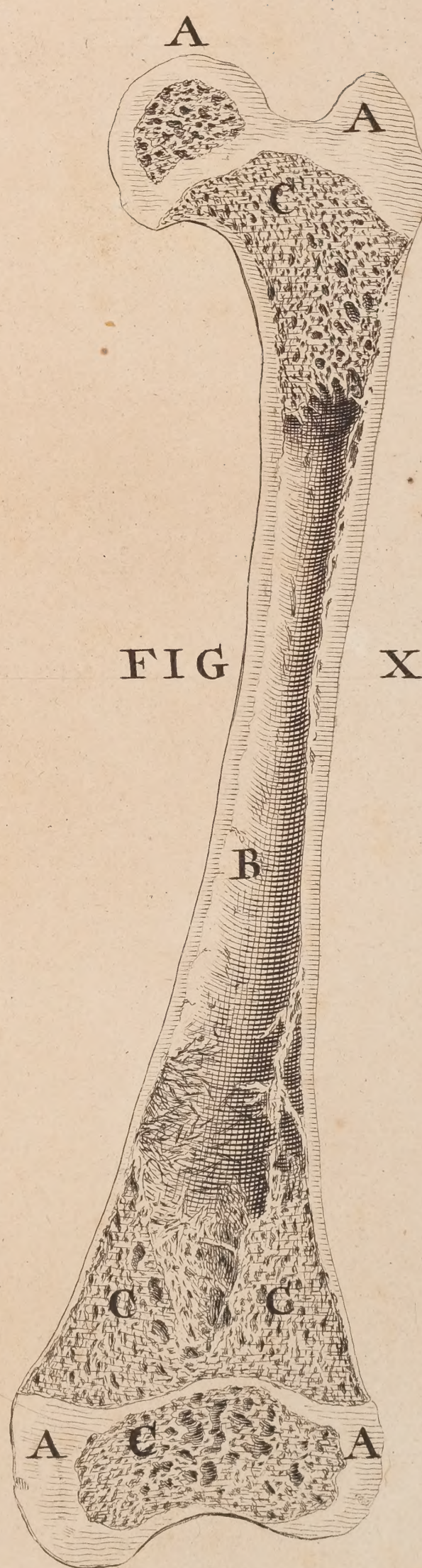


FIG IX

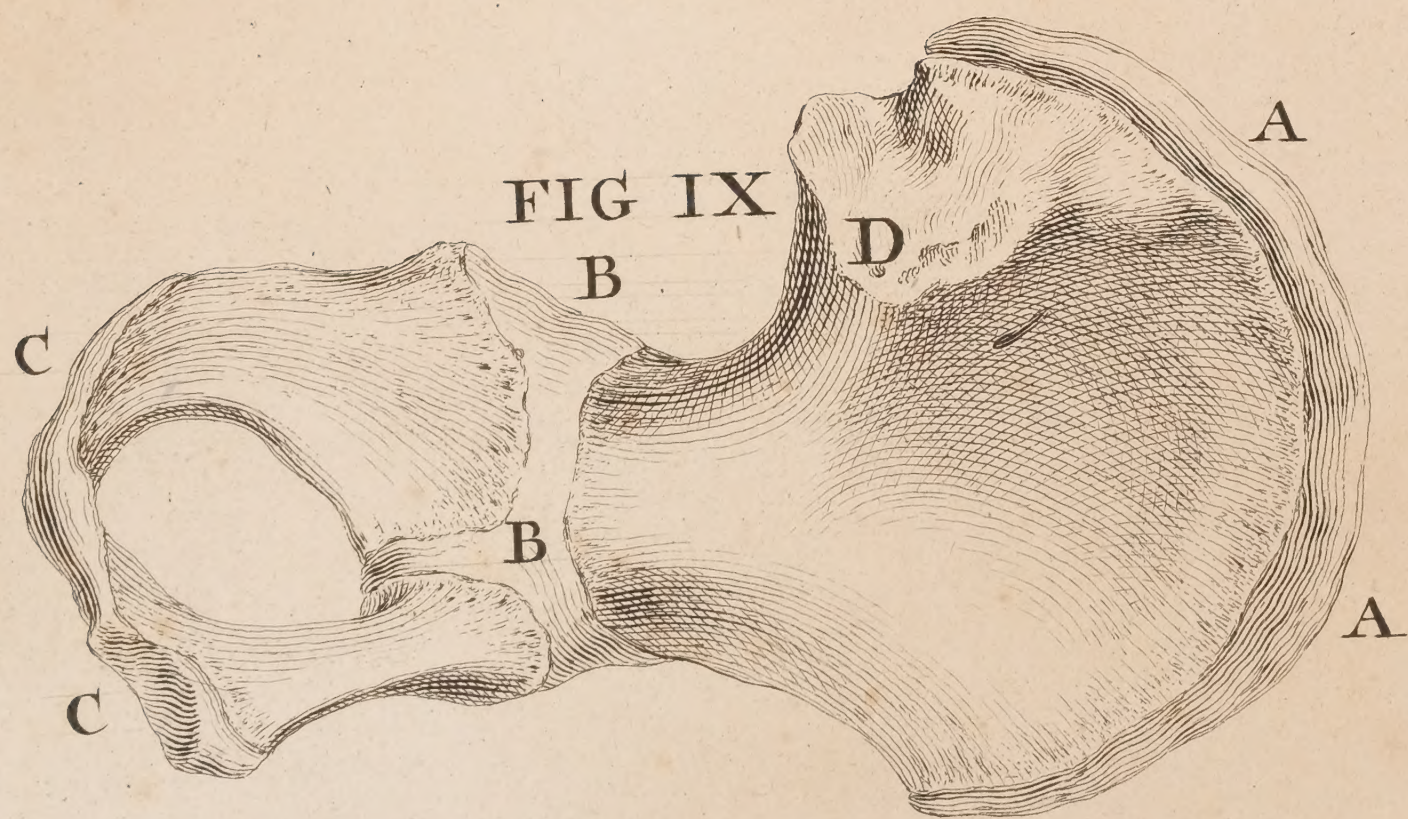


TABLE II.

SEVERAL bones sawed through to shew their inward spongy texture, the cells not being perfectly clear'd of the marrow that dried in them.

FIG. I.

THE clavícula.

FIG. II.

THE os humeri.

- A *The joining of the epiphysis at the upper end of the bone.*
- B *Part of the sinus into which the olecranon is received.*
- C *The large medullary sinus.*
- DD *The spongy cells.*

FIG. III.

- AA *Plain marks of the joining of the epiphyses.*
- B *The large medullary sinus.*
- CCCC *The spongy cells. That part near the second C at the upper end, having been accidentally broken, is not well represented.*

FIG. IIII.

PART of the os innominatum in which the outer table being rasped off, the inward texture is discovered.

- A *The place in which there is usually one dense substance without spongy cells.*
- B *That part of the acetabulum which is covered with a cartilage.*

FIG. V.

THE lesser os cuneiforme.

FIG. VI.

THE patella.

FIG. VII.

THE metatarsal bone of the great toe.

II

FIG III

FIG I

FIG II

FIG III

FIG V

FIG VI

FIG VII

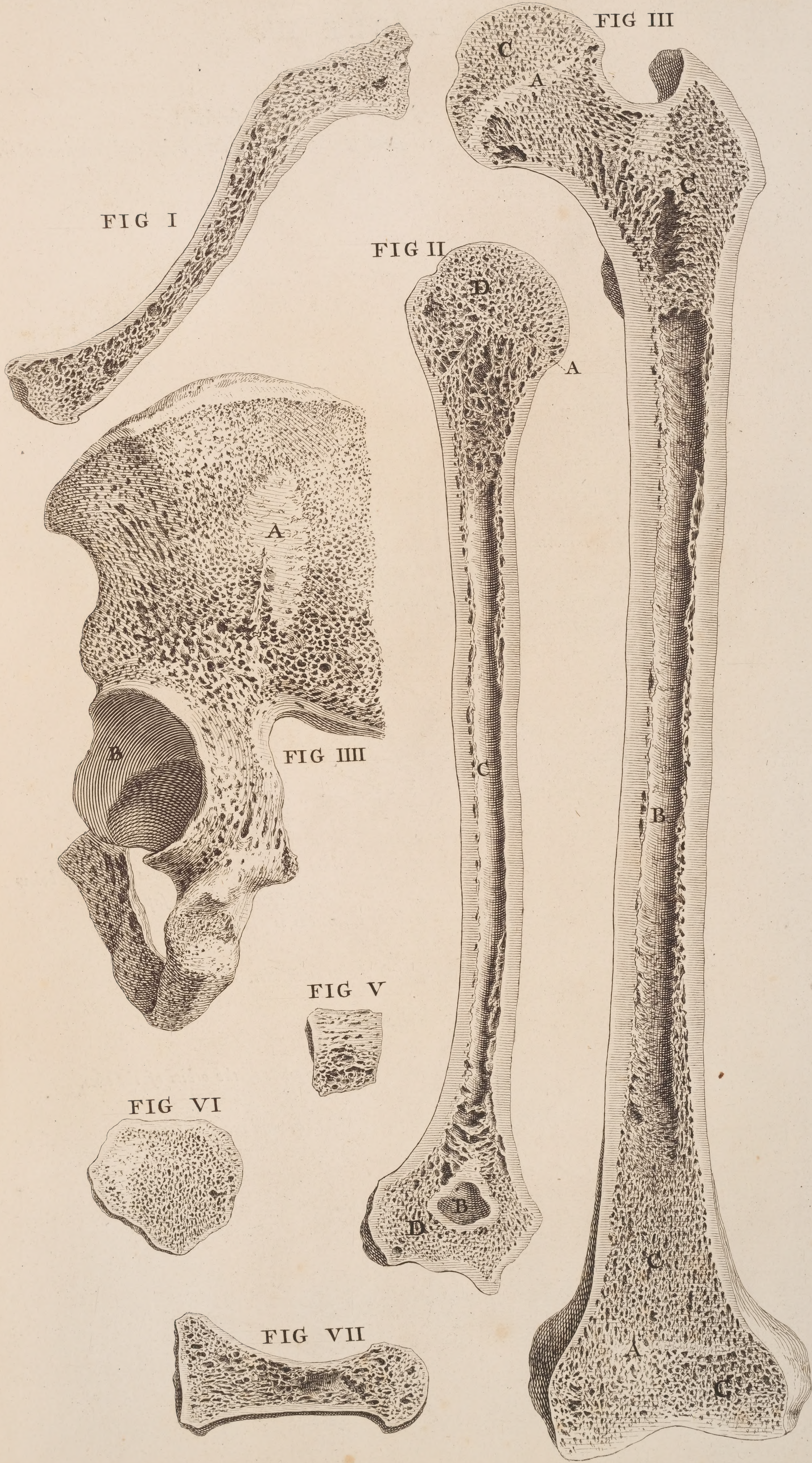


TABLE III.

FIG. I.

- A *Os frontis.*
- B *The hole through which a nerve and an artery pass to the forehead.*
- C *A notch which sometimes appears instead of the last mentioned hole, and sometimes there are both.*
- DDD *Sutura transversalis.*
- EE *Ossa nasi.*
- FFF *Maxilla superior.*
- G *A hole through which a nerve and an artery pass secure to the face.*
- H *Os unguis, in which may be seen the ductus ad nasum.*
- I *Os planum.*
- K *The hole, or the first foramen of the skull through which the optic nerve passes to the eye.*
- LL *The ossa malarum.*
- MM *Dentes incisores.*
- N *Dens caninus.*
- O *Dentes molares.*
- P *The meatus auditorius.*
- Q *Processus styloides.*
- R *Processus mamillaris.*
- S *Os jugale.*
- T *Foramen lacerum, or the second foramen of the skull.*
- U *Os sphœnoides.*
- V *Os temporis.*
- W *Os bregmatis.*
- X *Septum nasi.*
- Y *Sutura squamosa.*
- Z *Sutura coronalis.*

FIG. II.

- A *Os frontis.*
- BB *That part of the os frontis, which makes the upper part of the orbits of the eye.*
- C *That part of the os frontis, that is connected to the ossa nasi and maxilla superior, below which is seen in shadow the process, upon which the ossa nasi are supported.*
- D *The notch of the os frontis, in which the os ethmoides is placed.*
- EE *Sutura transversalis.*
- FF *That part of the os frontis that joins with the os ethmoides.*

FIG. III.

- AA *The inside of the os frontis.*
- BB *That part of the os frontis, which makes the upper parts of the orbits of the eyes.*
- CC *Two openings into the frontal sinusses.*
- D *That part of the os frontis that is join'd to the ossa nasi, and maxilla superior.*
- EEE *Sutura coronalis.*
- FFEEFF *Sutura transversalis.*
- G *The sagittal suture continued through the os frontis.*

III

FIG I

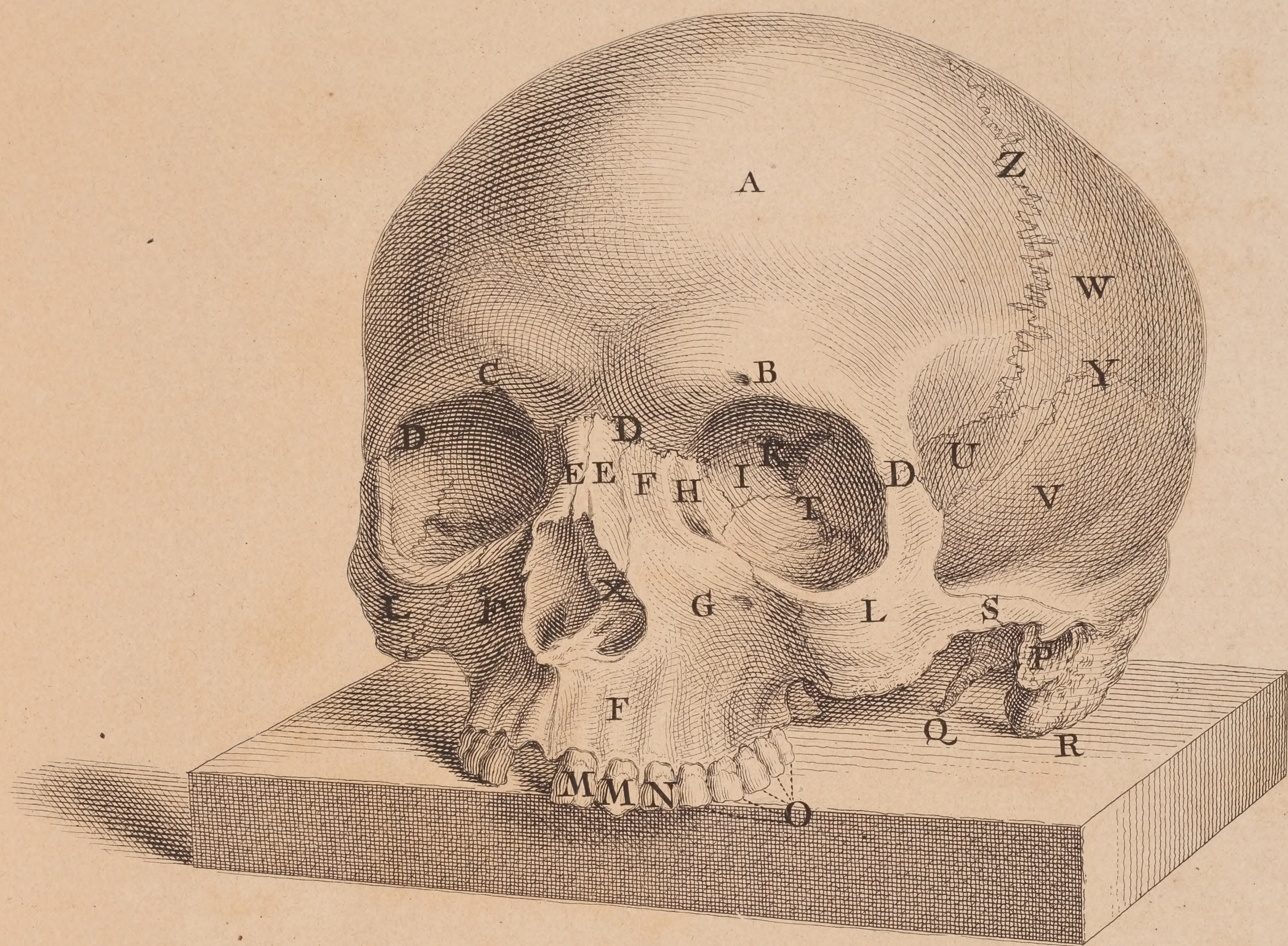


FIG II

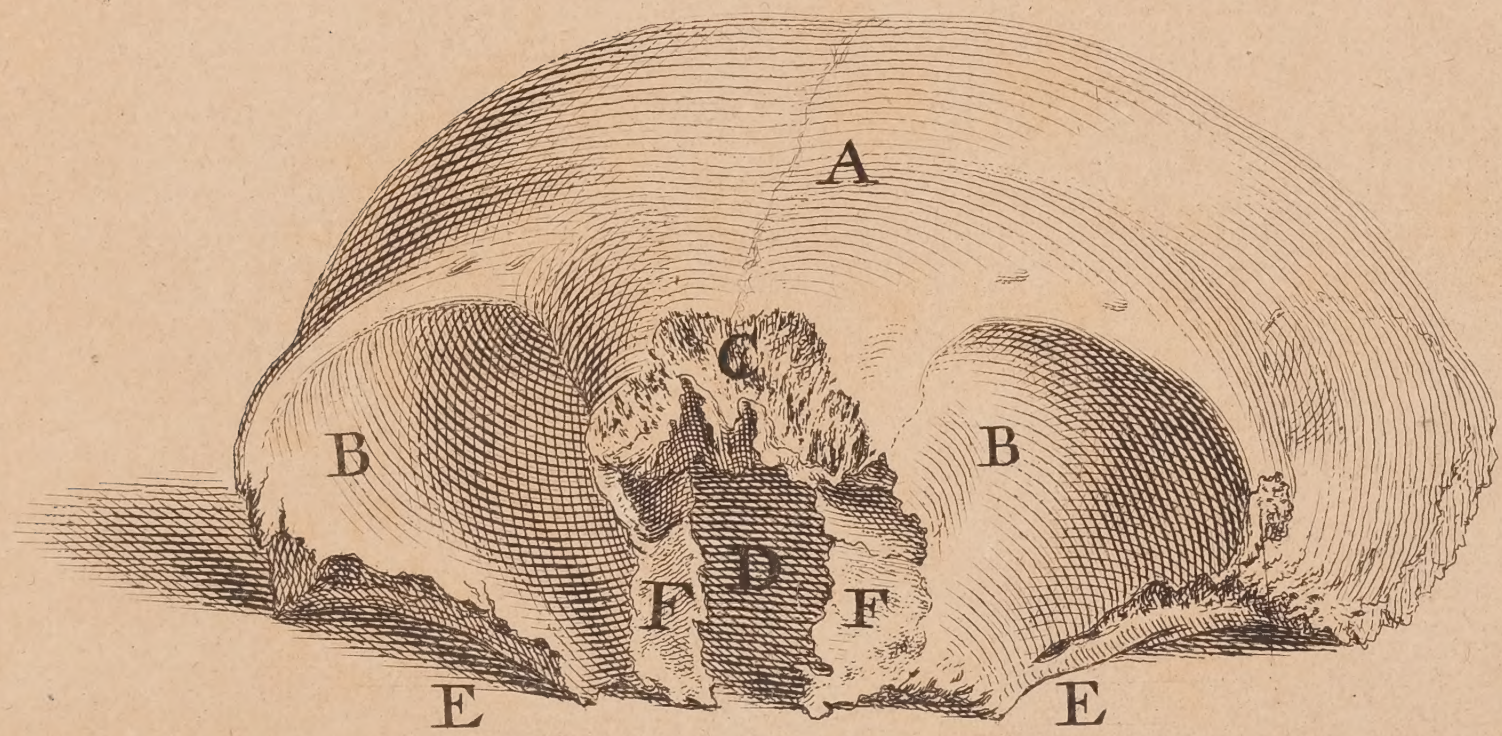


FIG III

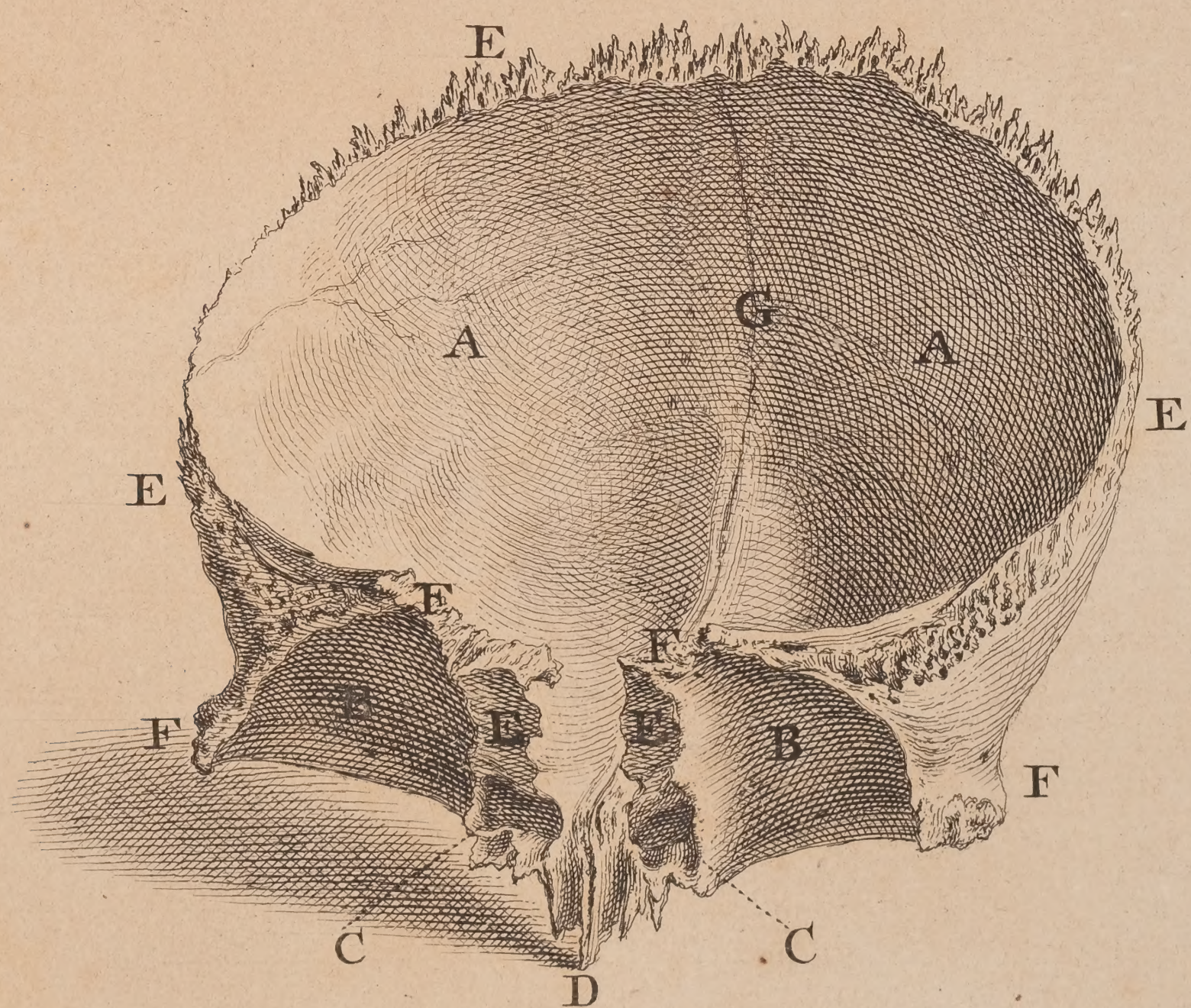


TABLE III.

FIG. I.

- A *Os frontis.*
- B *Sutura coronalis.*
- C *Os bregmatis.*
- D *Sutura lambdoidalis.*
- E *Os occipitis.*
- F *Sutura squamosa.*
- G *Os temporis.*
- H *Os sphœnoides.*
- I *Os malæ.*
- K *Maxilla superior.*
- L *Os unguis.*
- M *Os nasi.*
- N *Processus mastoideus.*
- O *Meatus auditorius.*
- P *Processus styloides.*
- Q *Processus jugales.*
- R *Processus pterygoides.*

FIG. II.

THE inside of the os malæ.

- A *The joining of the os malæ with the os frontis.*
- B *That part which joins to the maxilla superior.*
- C *That part which joins with the processus jugalis.*
- D *The foramen of the os malæ.*

FIG. III.

THE little bones of the ear.

FIG. IIII.

THE inside of the os unguis.

FIG. V.

THE inside of the ossa nasi.

FIG. VI.

THE inside of the os bregmatis.

- AA *Sutura coronalis.*
- BB *Sutura sagittalis.*
- CC *Sutura lambdoidalis.*
- DDD *Impressions made by the arteries of the dura mater upon the inside of the os bregmatis.*

FIG I

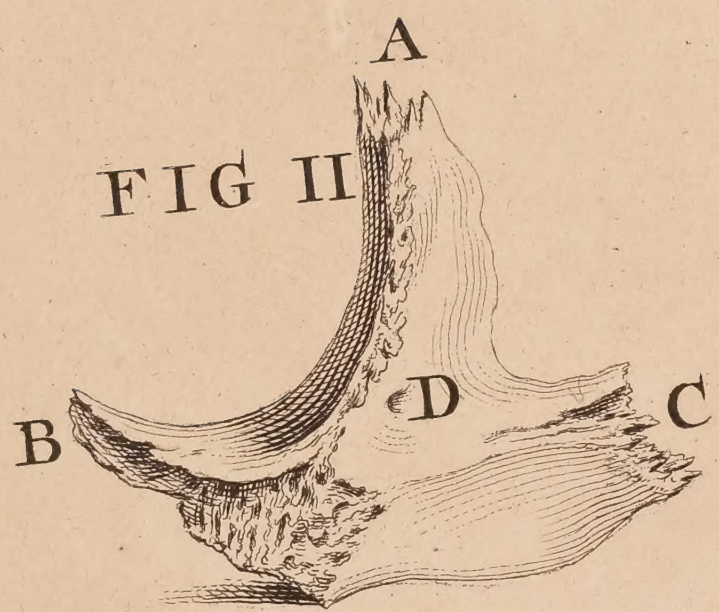
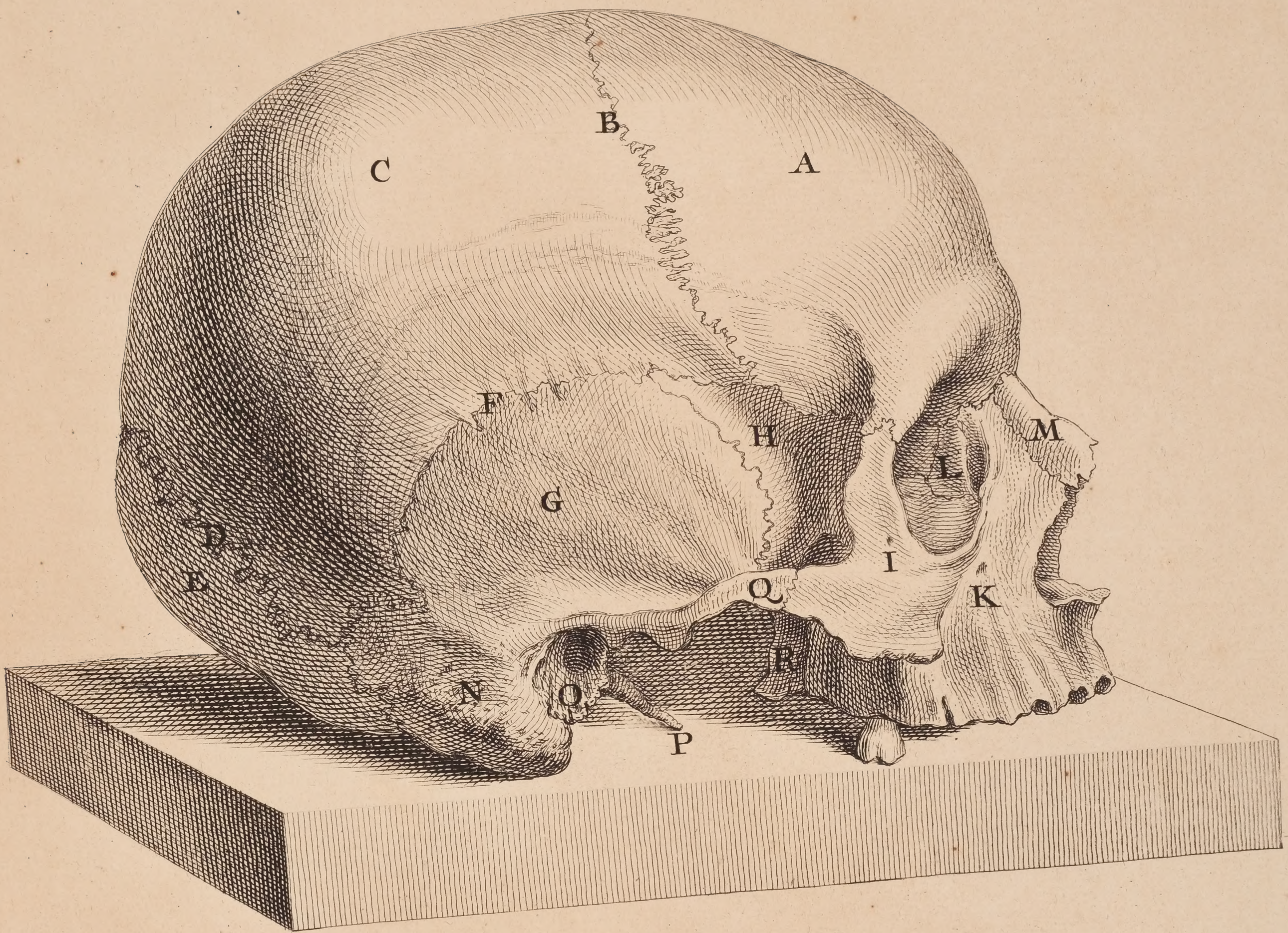


FIG III



FIG IIII



FIG V



FIG VI

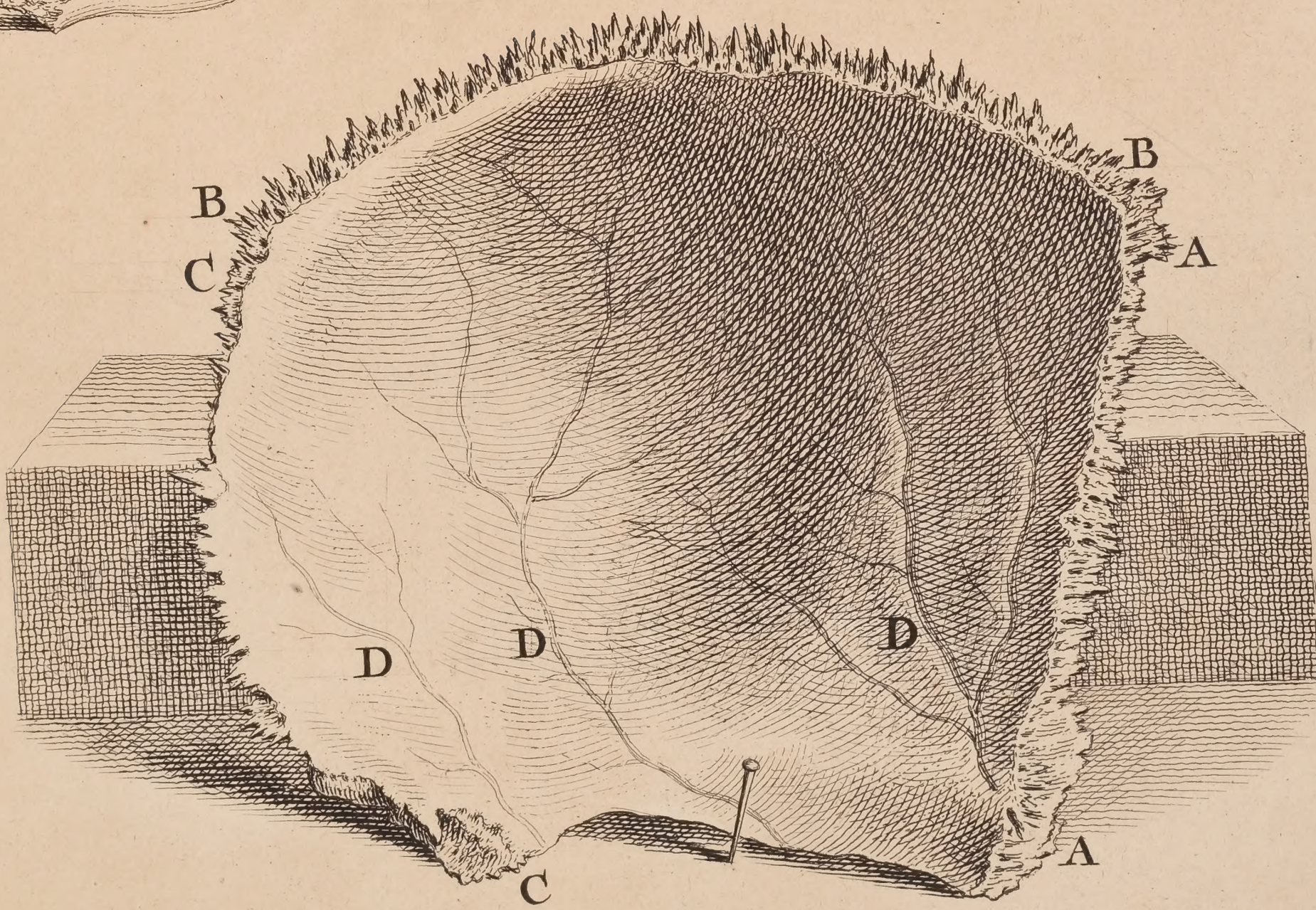


TABLE V.

FIG. I.

- AA *The upper jaw divided by a suture.*
 B *A foramen through which small vessels pass.*
 CC *Os palati.*
 DD *The external pterygoid processes.*
 EE *The joining of the processes of the ossa temporum and ossa malarum (commonly called ossa jugalia.)*
 F *Foramen lacerum.*
 GG *The places to which the lower jaw is articulated.*
 H *The end of the os petrosum, which is seldom joined to the neighbouring bones.*
 II *The mamillary processes.*
 KK *The sinuses on the inside of the mamillary processes.*
 LL *The processes of the occipital bone, to which the first vertebra is articulated.*
 M *Os vomer.*
 NN *The fourth foramina, through which pass the principal branch of the fifth pair of nerves.*
 O *Part of the passage of the carotid artery, into the skull.*
 PP *The fifth foramina, through which small arteries pass to the dura mater.*
 QQ *The sixth foramina for the passage of the carotid arteries, and the branches which begin the intercostal nerves.*
Between P and Q the styloid process.
 RR *The eighth foramina, through which pass the eighth pair of nerves and the internal jugular veins, and near the letter R on one side is seen a small hole, through which passes the portio dura of the auditory nerve.*
 S *A foramen for the passage of a vein behind the apophyses of the occipital bone, which is sometimes very large, and sometimes wanting.*
 T *The great foramen.*
 UUU *Os occipitis.*
 W *A large process of the os occipitis.*

FIG. II.

THE temporal bone.

- AA *The inside of the sutura squamosa.*
 B *processus jugalis.*
 C *processus styloides.*
 D *The seventh foramen.*
 E *The inside of the os temporis impressed by the brain.*
 F *The inside of that part which is called os petrosum, also impressed by the brain.*

FIG. III.

THE os occipitis.

- A *The crucial spine.*
 B *An os triquetrum in the lambdoidal suture.*
 CC *The eighth foramina of the skull.*
 DD *The ninth foramina of the skull.*
 EE *The processes which articulate with the first vertebra.*
 F *The part which joins the os sphenoides.*
 GGG *The lambdoidal suture.*

FIG I

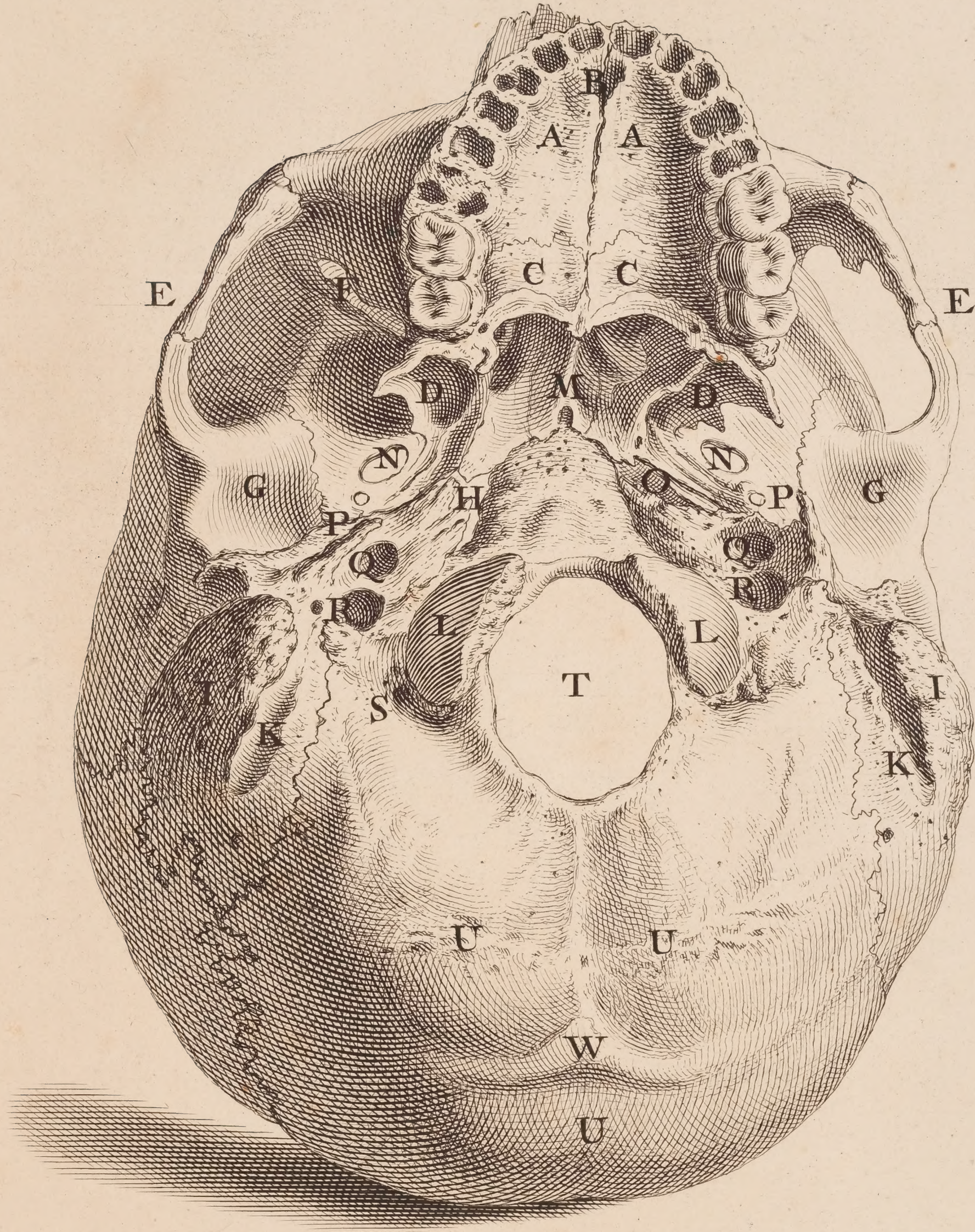


FIG II



FIG III

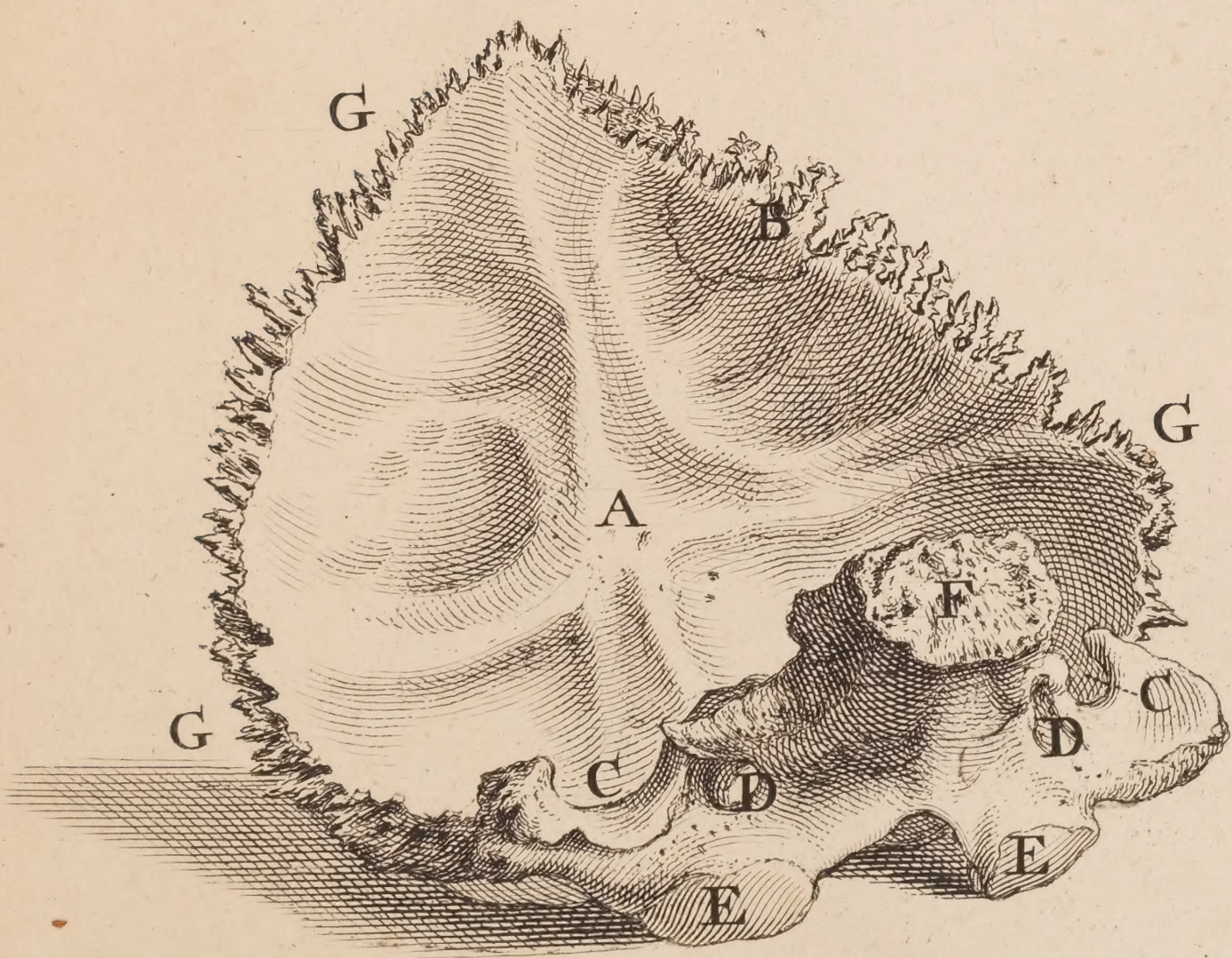


TABLE VI.

FIG. I.

A back view of the scull.

AA *The parietal bones.*

B *The coronal suture.*

C *The sagittal suture.*

D *One of those distinct irregular bones, usually found in the lambdoidal suture, called ossa triquetra.*

EEE *The lambdoidal suture.*

F *The occipital bone.*

G *The temporal bone.*

H *The mamillary process.*

I *Os jugale.*

K *The upper jaw.*

L *Os maleæ.*

FIG. II. FIG. III.

PARTS of the os parietale, taken from a fractured scull, of which a large account is given in the first chapter. Fig. II. shews the under side of one bit that came off, which leaving behind many very small portions, from them proceeded a callous which perfectly supplied this part of the bone; but the other coming off entire, there never came any callous in its place: The two uppermost holes were made to raise several fractured parts, and the third afterwards to discharge matter when the two first began to close.

FIG. III. FIG. V.

THE upper and lower jaw of a very old man that had lost all his teeth: These two bones did not weigh a fourth part so much as they usually do in men of the same stature.

AA *Maxilla superior.*

BB *Ossa palati.*

CC *The sockets of the teeth contracted and closed, and the whole bone vastly diminished, as will appear by comparing it with the following one, though that also is much contracted.*

FIG. V.

THE lower jaw.

AAA *The sockets of the teeth contracted and closed: These bones shew that the drawing in of the mouth and cheeks of very old men, is not so much from the loss of teeth as from the shrinking and contracting of the sockets and other the more spongy parts of the bones of the face, while the bone of the forehead and under side of the lower jaw being much harder do not waste and shrink so much.*

FIG I

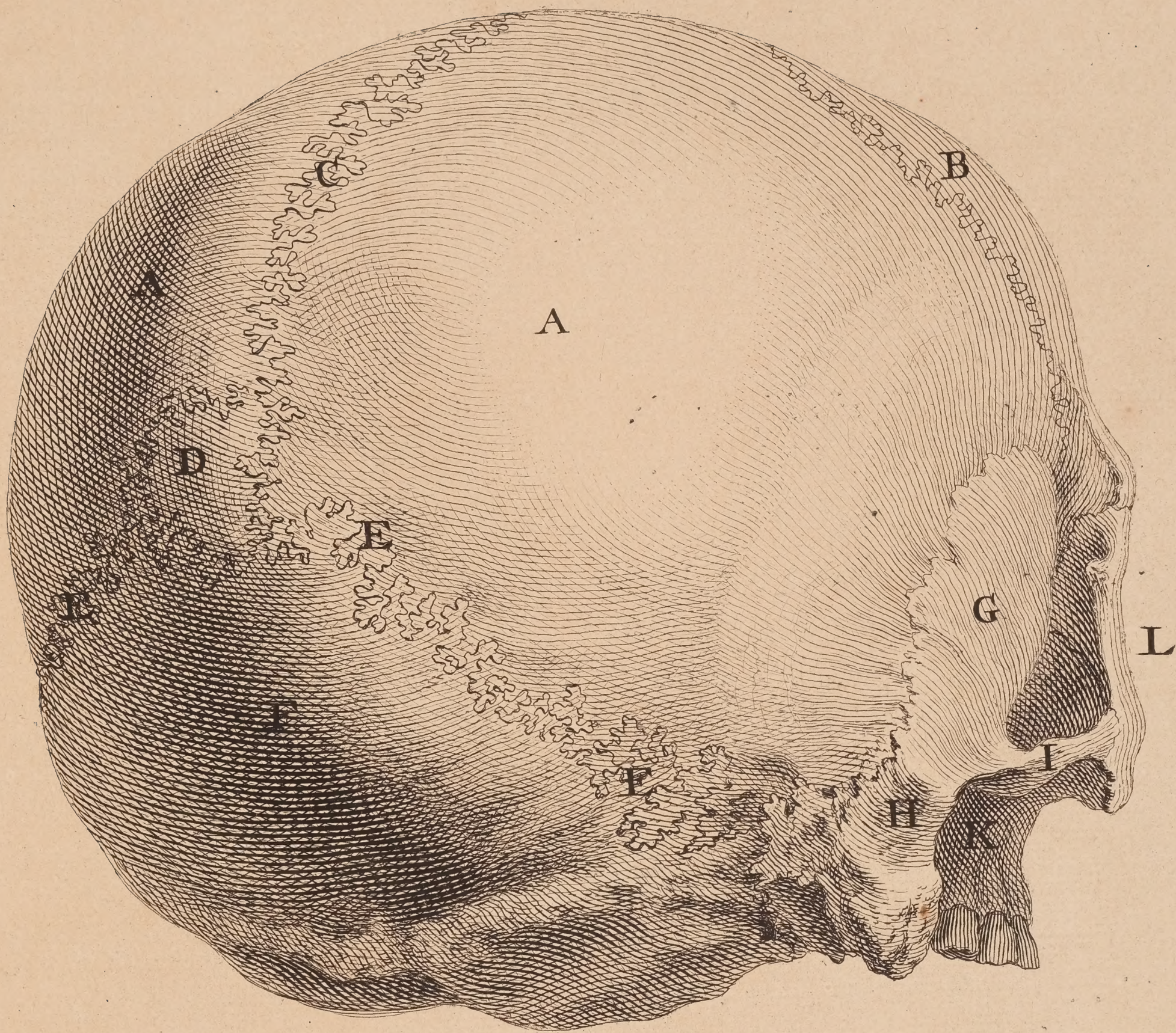


FIG II



FIG III

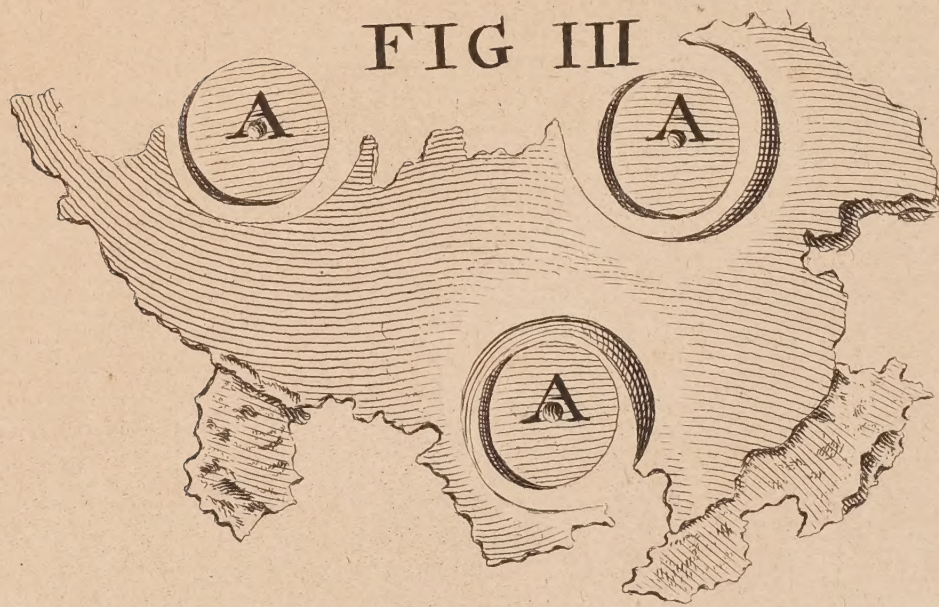


FIG V

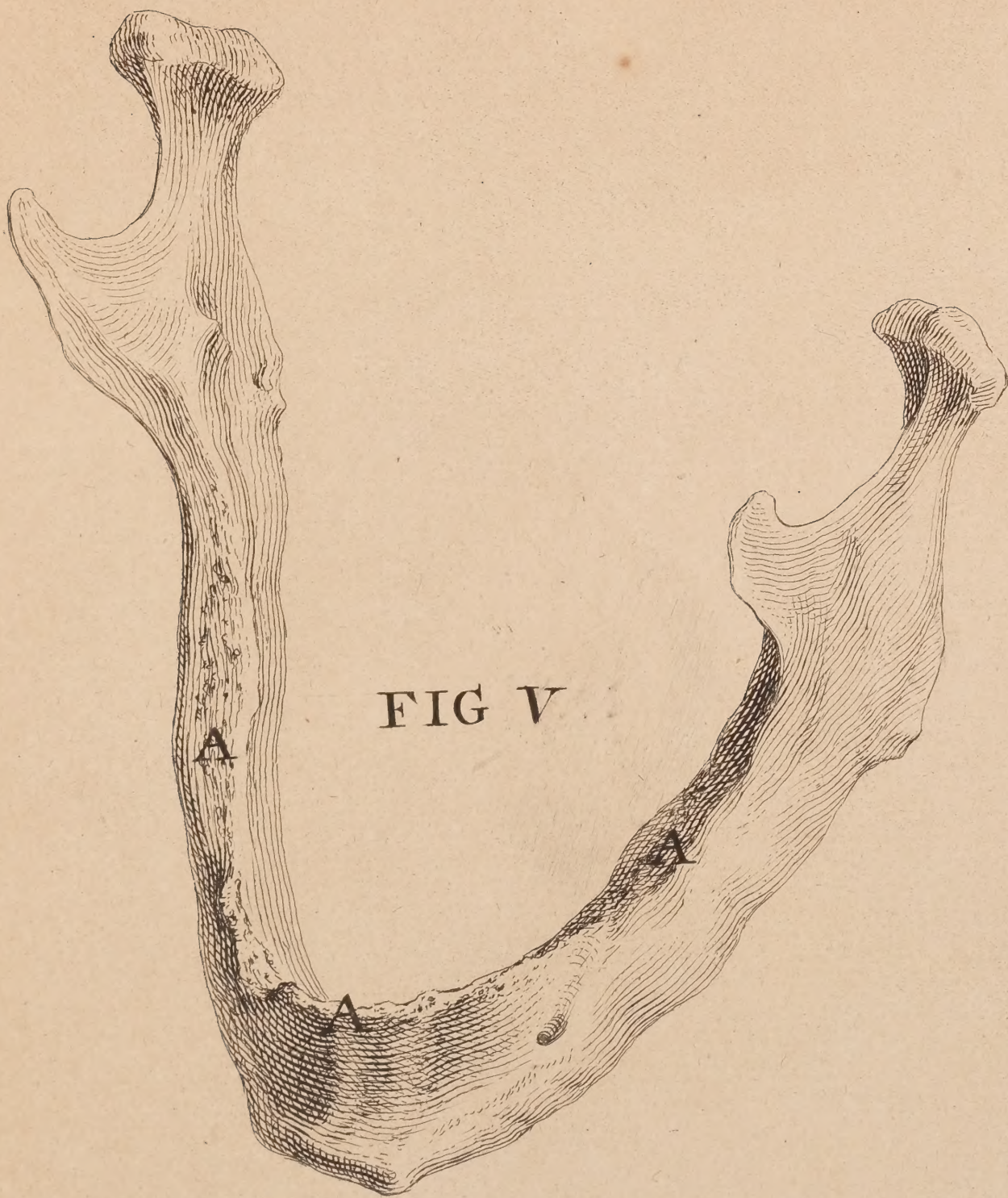


FIG III



TABLE VII.

FIG. I.

THE inside view of the basis of the scull.

- AA *The impressions made by the brain on the inside of the os frontis.*
- BB *The openings into the sinuses of the os frontis.*
- C *Crista galli.*
- DD *The impressions on the os sphenoides.*
- EFE *Sutura transversalis.*
- G *Sella Turcica.*
- HH *The anterior clinoid processes.*
- II *The posterior clinoid processes.*
- KK *The holes through which the optic nerves pass, or the first foramina of the scull.*
- LL *The third foramina of the scull.*
- MM *The sixth foramina of the scull.*
- NN *The fourth foramina of the scull.*
- OO *The fifth foramina of the scull.*
- PP *Ossa petrosa.*
- Q *The great foramen.*
- R *The crucial spine of the os occipitis.*
- SS *Remarkable impressions on the os occipitis, in which the cerebellum is lodged.*
- T *Part of the crucial spine of the os occipitis.*
- UU *The inside of the os temporis.*
- V *The eighth foramen of the scull.*

FIG. II.

THE inside view of the scull, cut perpendicularly.

- A *Os frontis.*
- B *Sinus frontalis.*
- CC *Os bregmatis.*
- D *Os occipitis.*
- E *Os petrosum.*
- F *The seventh foramen, through which the auditory nerve passes.*
- G *The ninth foramen.*
- H *Processus clinoides.*
- I *Sella turcica.*
- K *Crista galli.*
- LL *Sinus sphenoidalis.*
- M *Os nasi.*
- N *A process of the os ethmoides, that makes part of the septum nasi.*
- O *Part of the os sphenoides, that makes part of the septum nasi.*
- P *Os vomer.*
- Q *The suture of the upper jaw.*
- R *Processus pterygoides.*
- S *Maxilla superior.*
- T *The styloid process.*
- UU *Sutura sagittalis.*
- V *The spongy substance of the os sphenoides.*
- W *Part of the diploe of the os occipitis.*

VII

FIG I

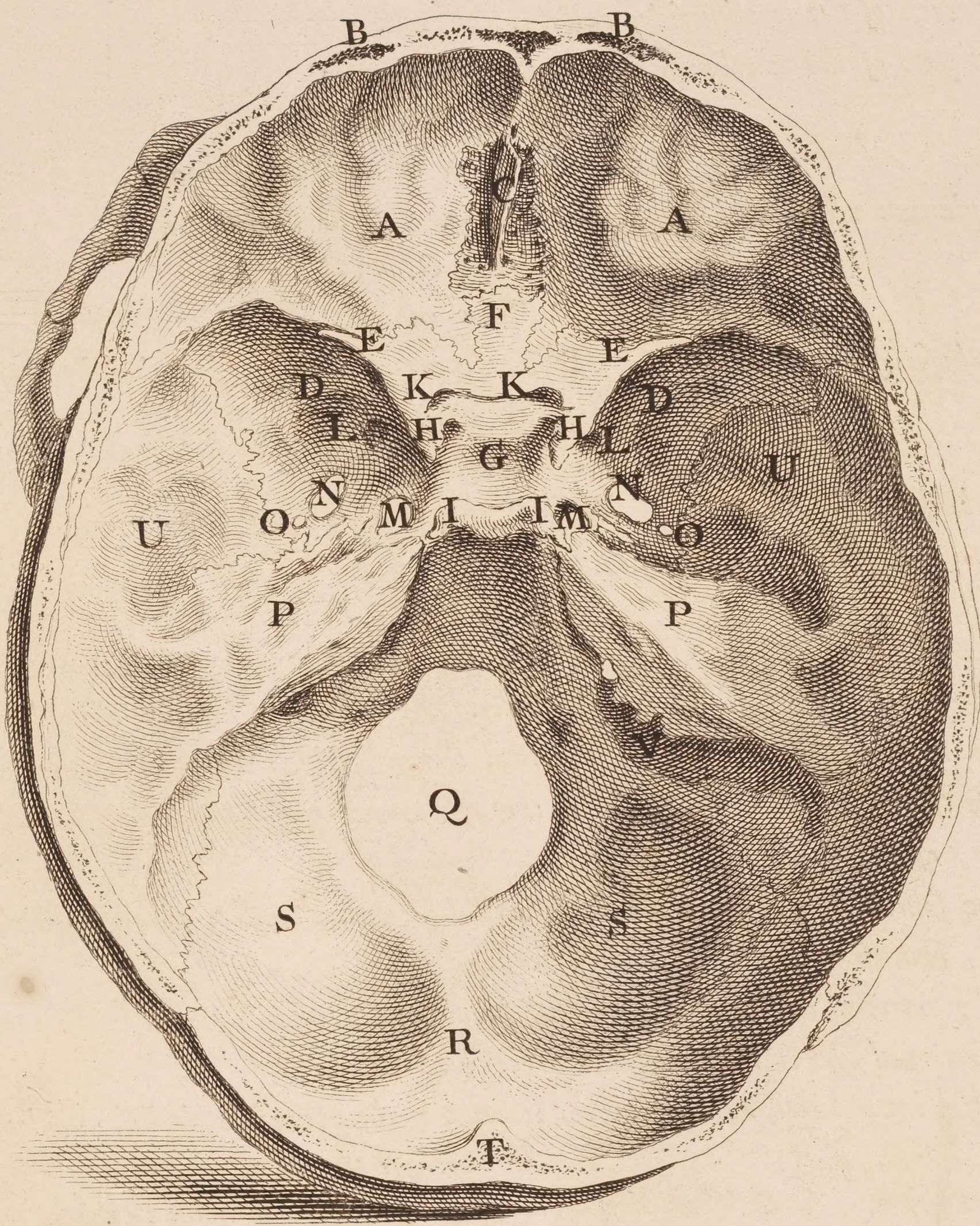


FIG II

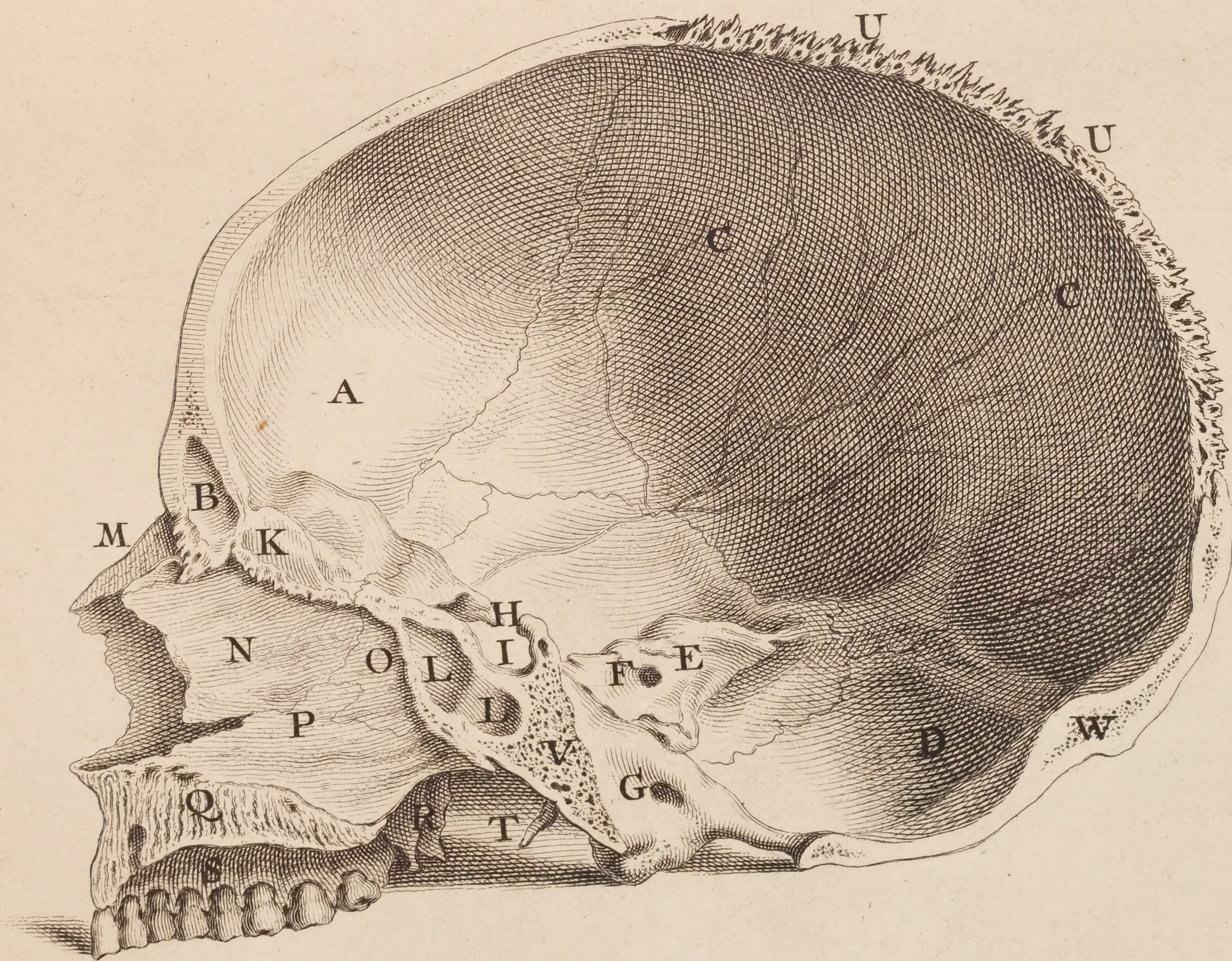


TABLE VIII.

FIG. I.

THE OS ETHMOIDES OR CRIBRIFORME.

- A *A process of the os ethmoides call'd crista galli.*
 B *That part of the os ethmoides that is call'd planum.*

FIG. II.

ANOTHER view of the same bone.

- A *Os planum which makes part of the orbit.* B *Os vomer.*

FIG. III.

THE OS PALATI.

- A *The basis of the os palati.* B *That part of the os palati that lies in the orbit.*

FIG. IIII.

THE VOMER.

- A *The basis of the vomer.* B *That part of it next the eye.*
 C *That part of it next the roof of the mouth.*

FIG. V.

THE OS SPHENOIDES.

- AA *The concave part of the os sphenoides.* BB *The anterior clinoid processes.*
 C *Sella turcica.* DD *The foramina, through which the optic nerves pass.*
 EE *The third foramina of the scull, through which passes the second branch of the fifth pair of nerves.*
 FF *The fourth foramina of the scull, call'd foramina ovalia, through which passes the third branch of the fifth pair of nerves.*
 GG *The external alæ of the pterygoid processes.*
 H *The internal alæ of the pterygoid processes.*
 I *Processus innominati, over which the tendons of the pterygostaphylini muscles are reflected.*

FIG. VI.

- A *Sella turcica.* B *That part of the os sphenoides that joins to the os occipitis.*
 CC *The anterior clinoid processes.* DD *The external alæ of the pterygoid processes.*
 E *The internal alæ.* F *Processus innominati of the pterygoid processes.*
 GG *The concave parts of the os sphenoides.*
 HH *Apophyses spinosæ, which meet the ossa petrosa.*
 II *Two foramina, through which an artery passes to the nares.*

FIG. VII.

- A *The convex part of the os sphenoides.* B *That part of it that makes the internal orbit.*
 C *The septum of the sphenoidal sinus.* DD *The internal alæ of the pterygoid processes.*
 E *Processus spinosus next the os petrosus.* F *The third foramen of the scull.*
 GG *The external alæ of the pterygoid processes.* H *The first foramen of the scull.*
 I *Processus innominati.* K *The sphenoidal sinus.* L *Foramen lacerum.*
 M *The foramen through which an artery passes to the nose.*

FIG. VIII.

- AA *That part of the sphenoides that makes part of the orbit of the eye.*
 BB *The convex part of the os sphenoides.* C *The Septum of the sphenoidal sinus.*
 DD *The fourth foramina of the scull.* EE *Processus spinosi which join to the ossa petrosa.*
 FF *The external alæ of the pterygoid processes.* G *The internal alæ.*
 H *The first foramen of the scull.* I *Foramen lacerum.* K *The sphenoidal sinus.*
 L *The third foramen of the scull.*
 M *The foramen through which the artery passes to the nose.*

VIII

FIG I



FIG II



FIG III



FIG IIII



FIG V

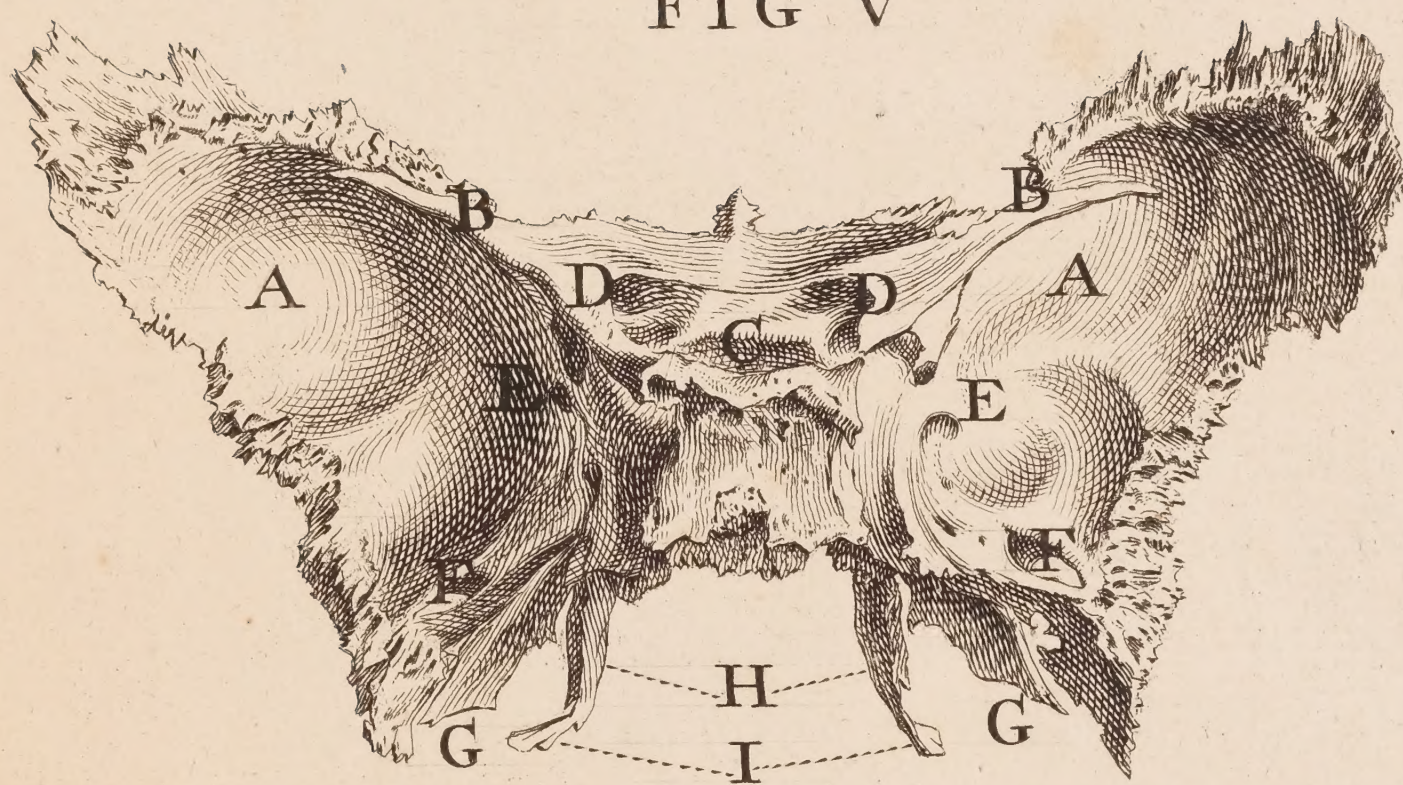


FIG VI

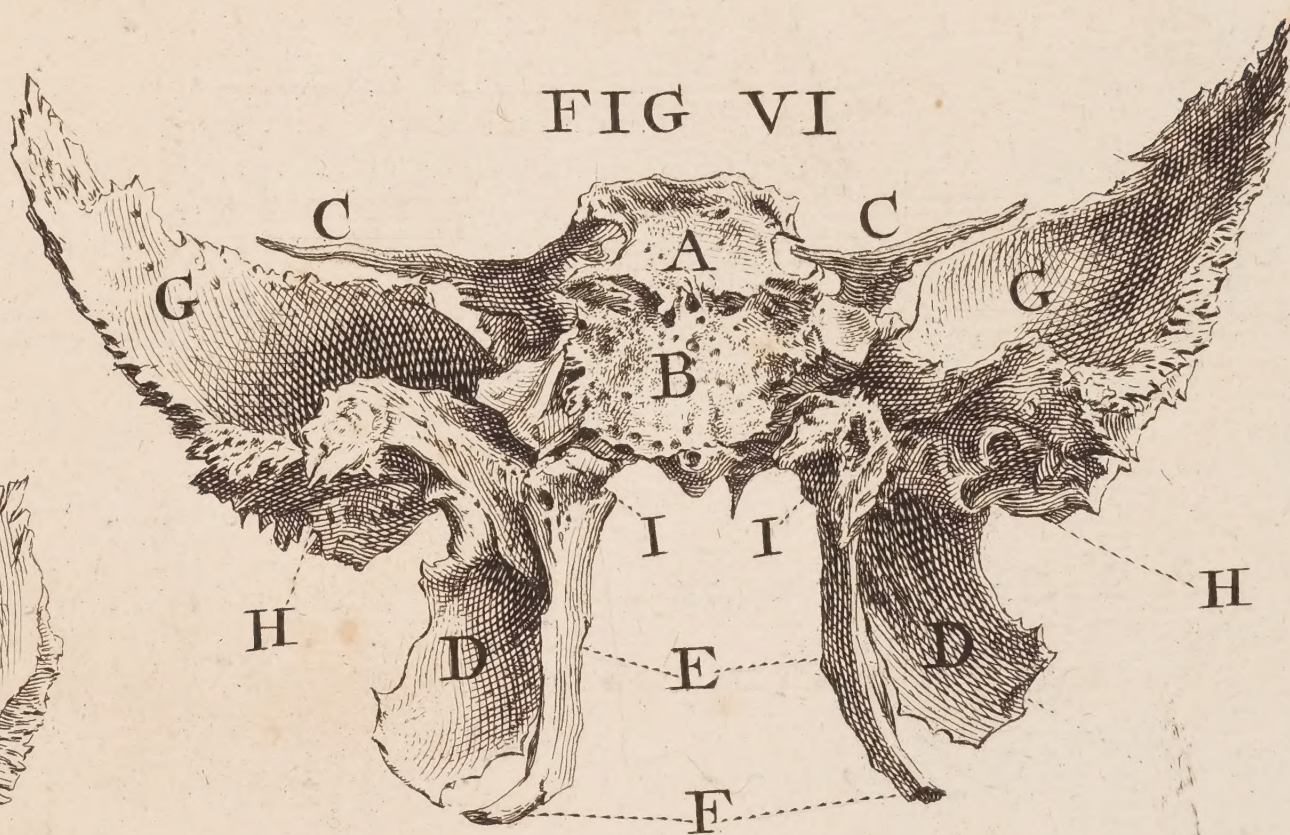


FIG VII



FIG VIII

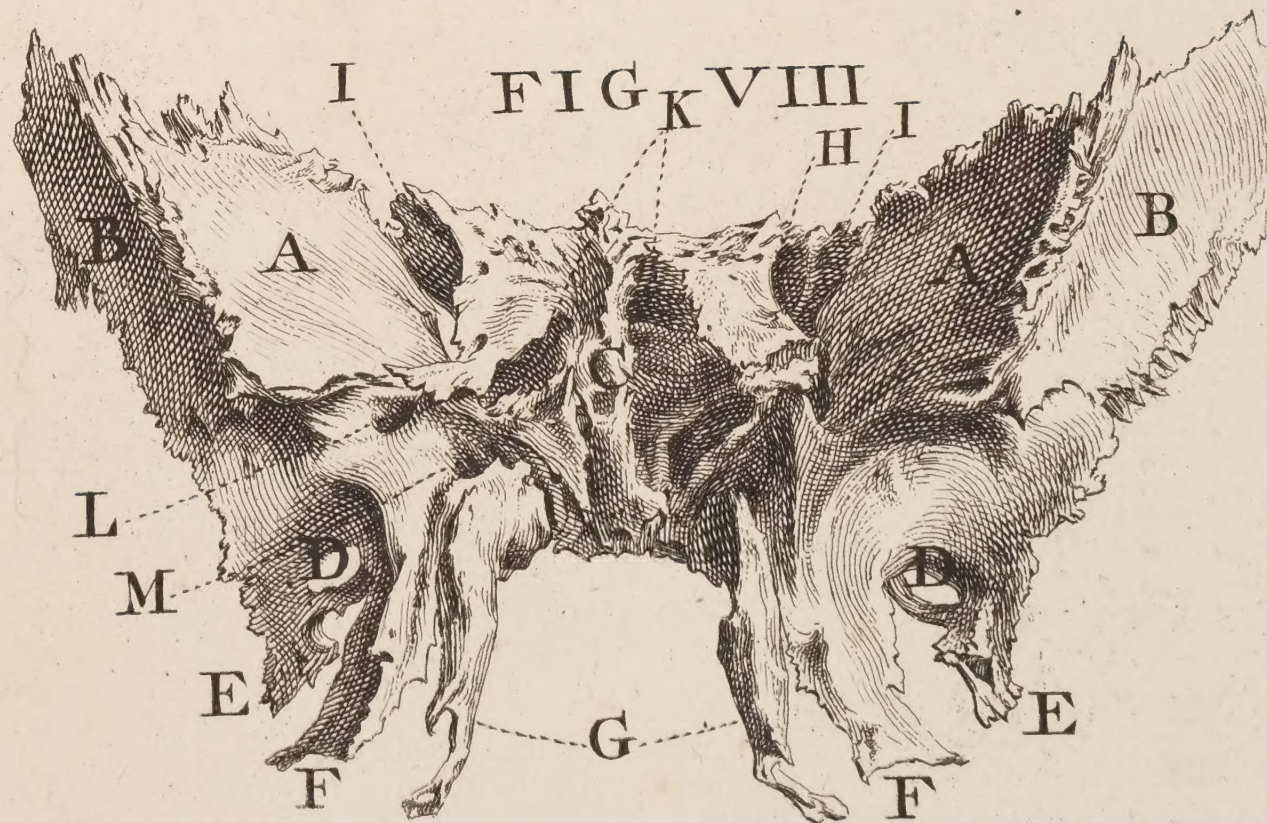


TABLE IX.

FIG. I.

THE lower jaw with the teeth.

- AA *Processus condyloides.* BB *Processus coronalis.*
 C *A Foramen through which the blood-vessels and a branch of the fifth pair of nerves enter for the nourishment of the teeth.*
 D *That through which they come out.* EE *Two of the dentes incisores.*
 F *One of the dentes canini.* G *Four of the dentes molares.*

FIG. II.

THE upper jaw with the teeth.

- AA *The upper part which is joined by a suture above to the os frontis, on the fore part to the ossa nasi, and on the back part to the os unguis.*
 BB *Foramina, through which a branch of the fifth pair of nerves, and vessels pass to the face.*
 CC *Those parts which are joined to the ossa malarum.*
 D *A suture which parts the jaw in the middle.* DD *Dentes incisores.*
 E *Dens caninus.* F *Dentes molares.*

FIG. III.

THE sockets of the teeth of one half of the lower jaw.

- A *Processus condyloides.* B *Processus coronalis.*
 C *The sockets of the teeth, as they appear upon taking away their external sides.*
 D *A foramen through which the blood-vessels and nerve pass from the teeth.*

FIG. IIII.

HALF of the upper jaw with its antrum.

- A *The process of the upper jaw, that joins to the os nasi, frontis, &c.*
 B *That part that joins to the os male.*
 C *That part of it that contributes towards making the orbit of the eye.*
 D *A foramen through which the nerve passes to the face.* E *Antrum Highmorianum.*
 F *A little process without a name.* G *Dentes incisarii.* H *Dens caninus.* I *Dentes molares.*

FIG. V.

THE internal view of half of the lower jaw.

- A *Processus coronalis.* B *Processus condyloides.*
 C *A foramen through which the vessels and nerve pass to the teeth.*
 D *The angle of the lower jaw.* E *A remarkable rough ridge.* F *The bony cells.*

FIG. VI.

THE inside of one half of the upper jaw.

- A *That part towards the cavity of the nose.*
 B *The upper part of it that joins to the os frontis, nasi, &c.*
 C *That part that joins to the other half of the upper jaw.*
 D *That part that makes the greatest share of the roof of the mouth.*
 E *That part that joins to the os palati.*
 F *The little process that appears in the fore part of the cavity of the nose.*
 G *One of the dentes incisarii.*

FIG. VII.

THE teeth of both jaws.

- A *Eight of the teeth of the upper jaw.* B *Eight of the lower jaw.*
 C *Two of the dentes molares grown into each other.*
 D *One of the dentes molares saw'd perpendicularly to shew the cavities, through which the vessels and nerve pass.*

IX

FIG I

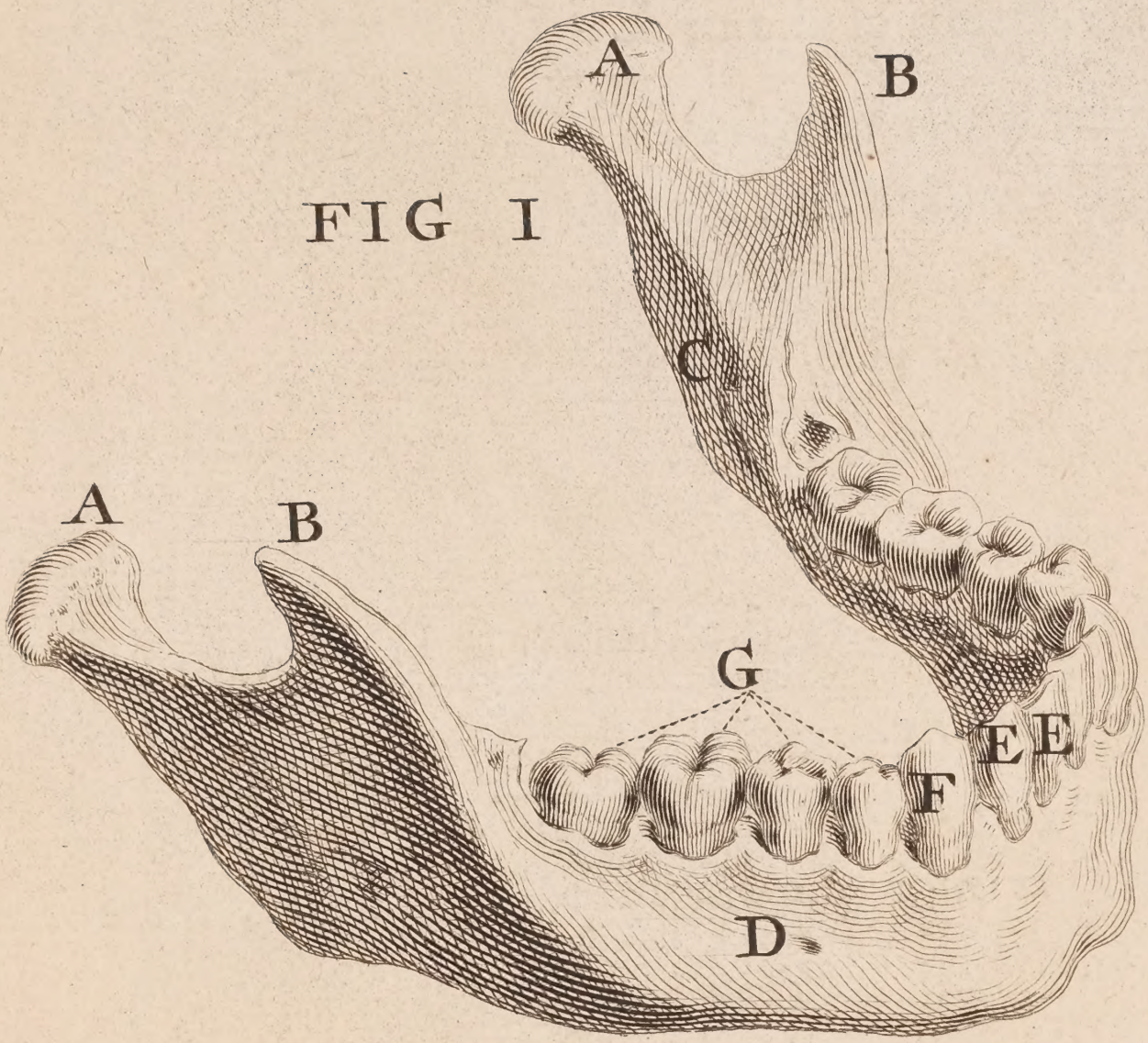


FIG II

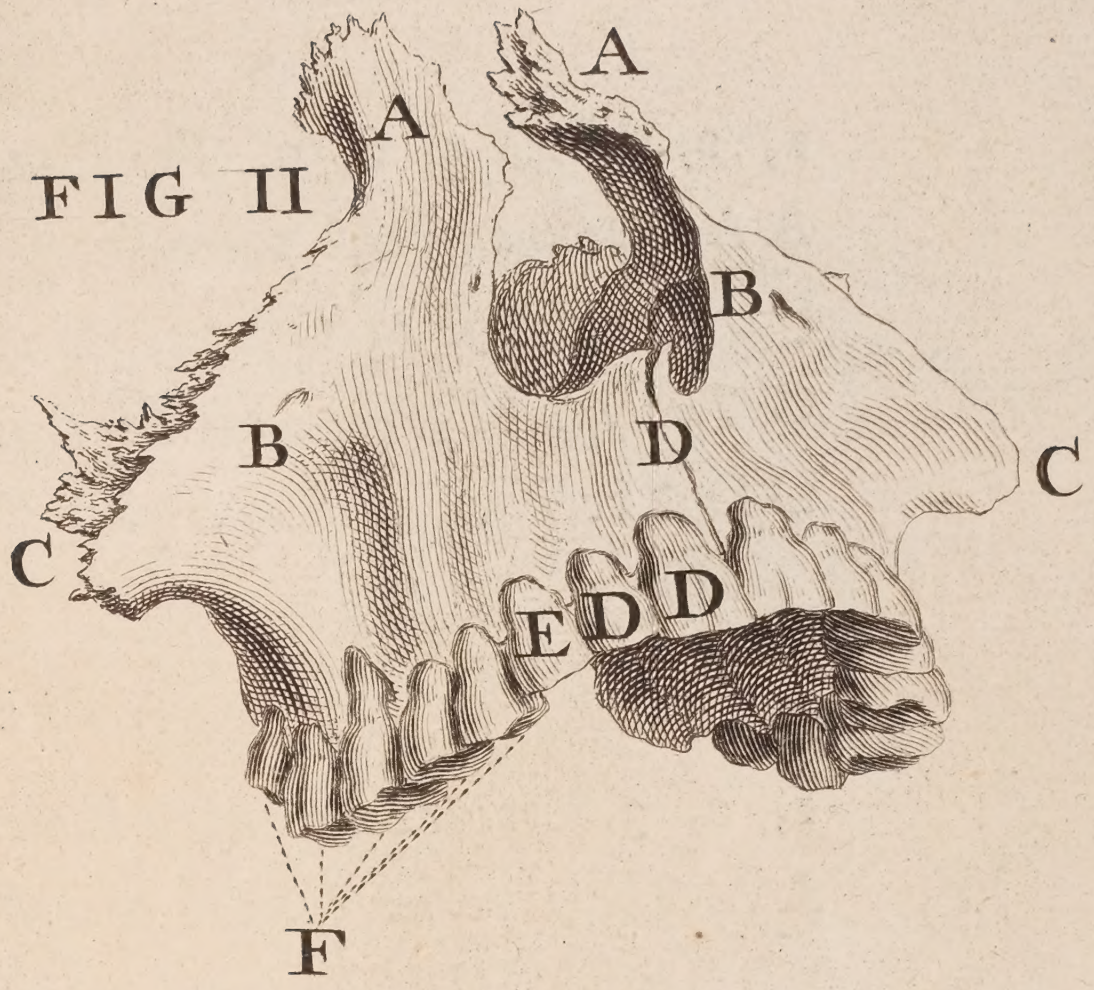


FIG III

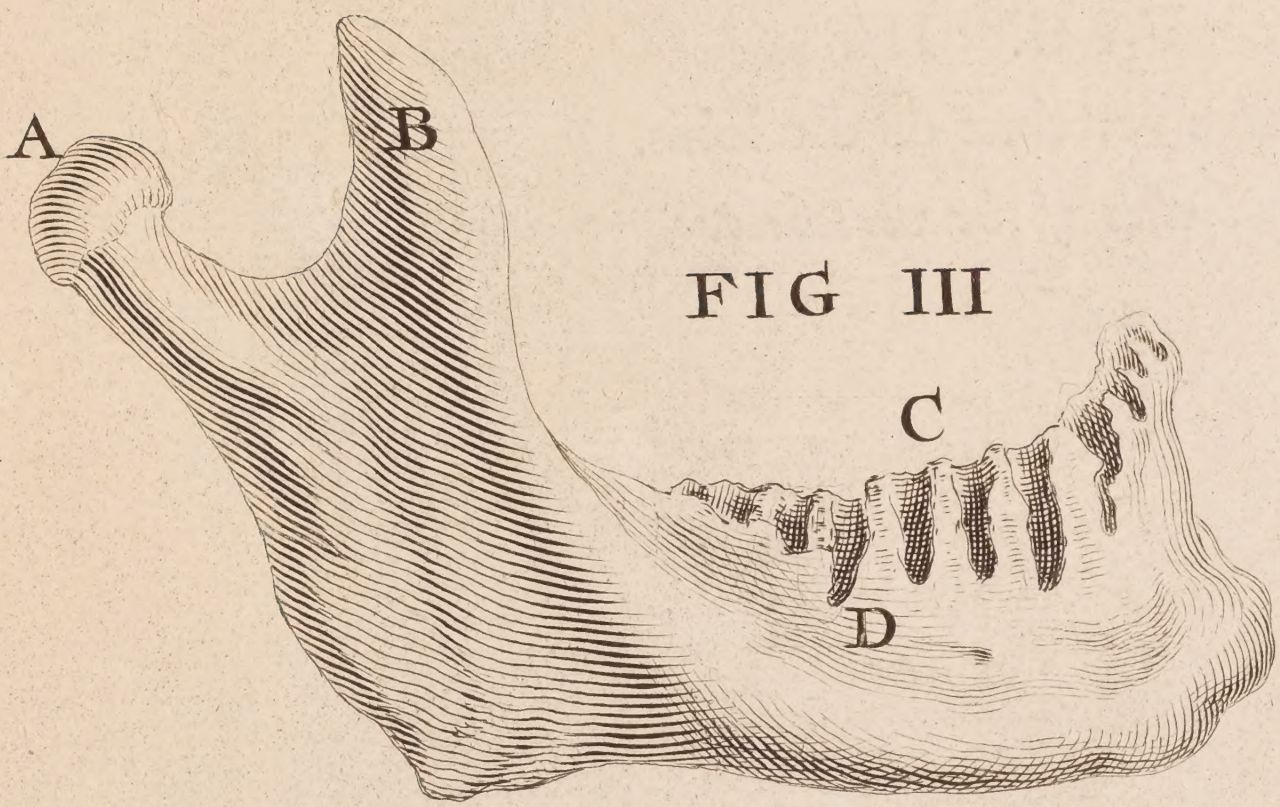


FIG IIII

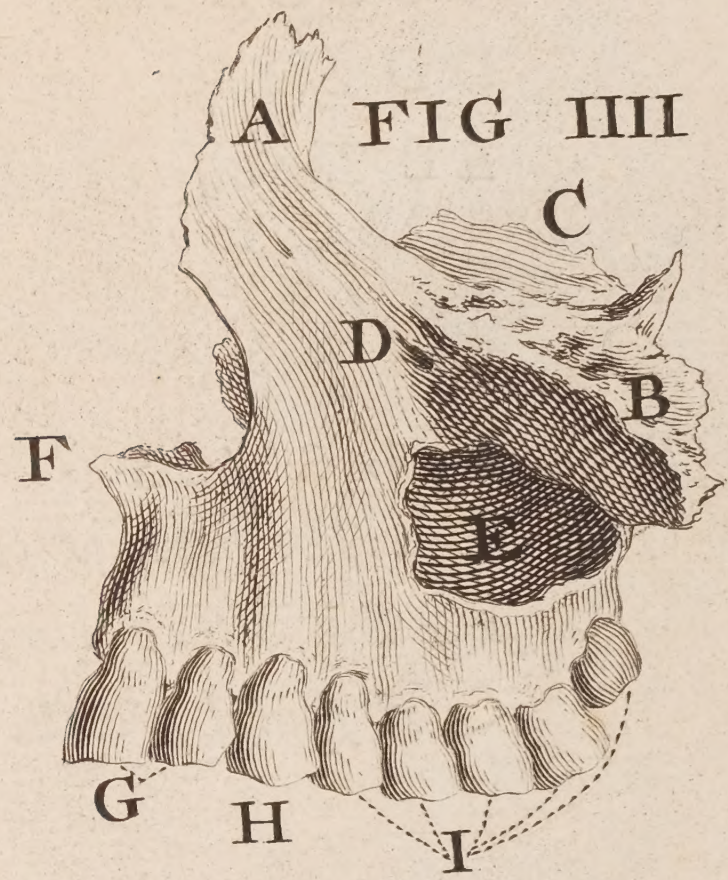


FIG V

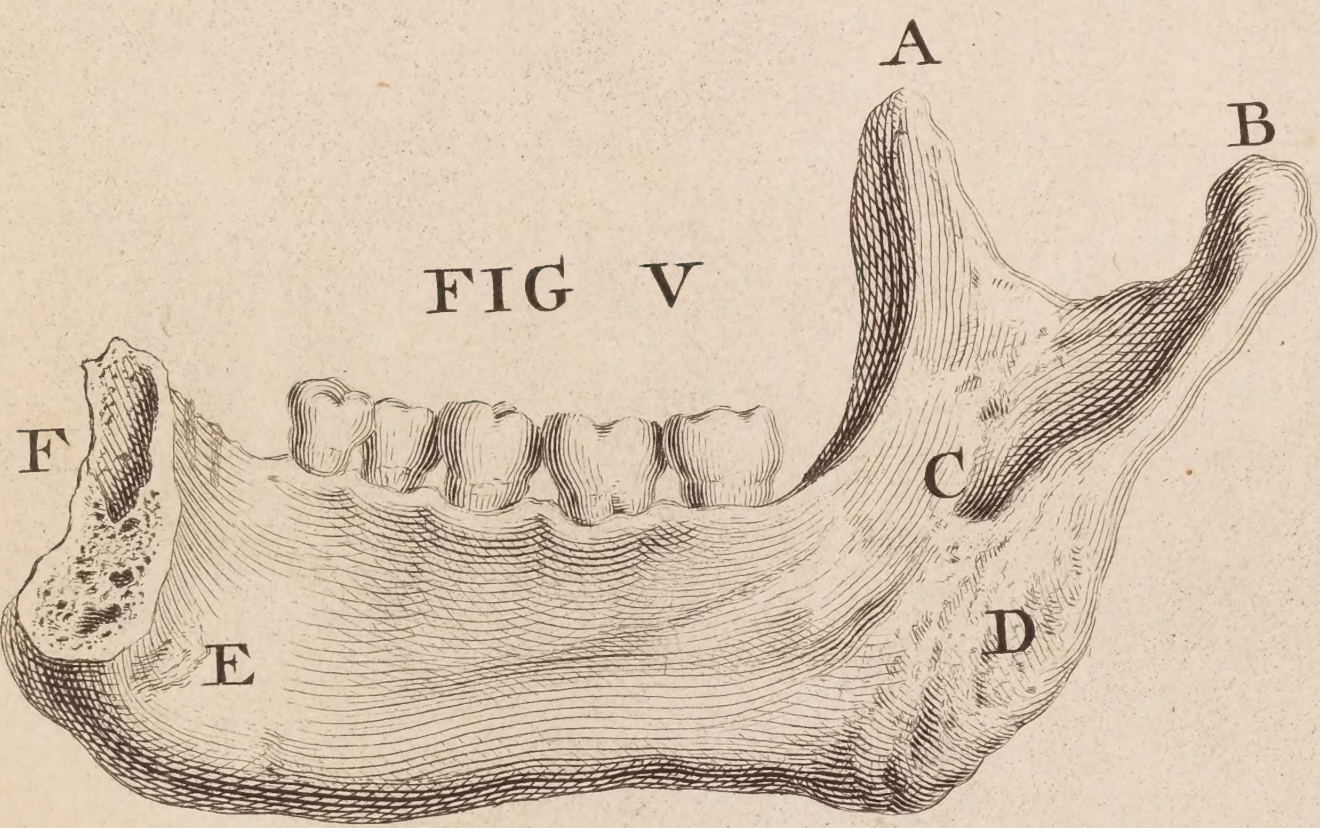


FIG VI

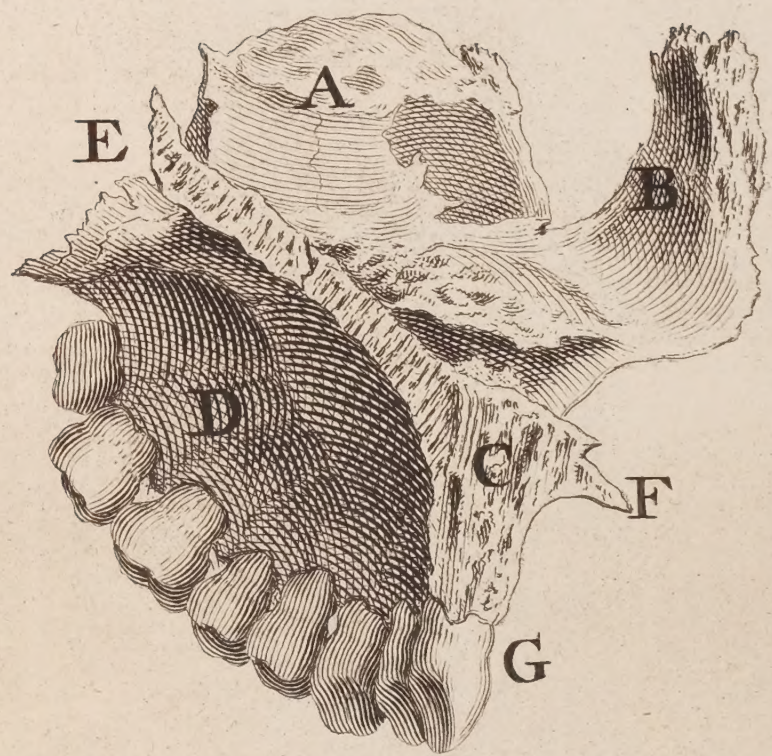


FIG VII



TABLE X.

FIG. I.

THE vertebræ of the neck.

- 1, 2, 3, 4, 5, 6, 7. *The spongy bodies of the vertebræ.*
 A A *The transverse processes of the first vertebra nam'd atlas.*
 B B *Transverse processes of the vertebræ.*
 C *The spinal process of the seventh vertebra.*
 D D *The inferior oblique processes of the seventh vertebra.*

FIG. II.

THE twelve vertebræ of the thorax.

- 1, 2, 3, &c. *The spongy bodies of the vertebræ.*
 A A *The superior oblique processes of the first vertebra of the back.*
 B B B B B B B B *The transverse processes, in each of the ten superior of which, there is a sinus that receives the ribs.*
 C C C C C *The spinal processes.*
 D D *Shallow sinuses in the spongy bodies of the vertebræ which receive the ends of the ribs.*
 E E *The inferior oblique processes of the last vertebra of the back.*

FIG. III.

THE five vertebræ of the loins.

- 1, 2, 3, 4, 5. *The anterior spongy bodies of the vertebræ.*
 A A *The superior oblique processes.*
 B B B B B *The transverse processes.*
 C *A spinal process.*

TABLE XI.

FIG. I.

THE under side of the first vertebra.

- A Foramen. BB The articulation with the second vertebra.
 C The articulation with the processus dentatus of the second. D The side.
 EE The perforations for the cervical arteries. F The fore part.
 GG The transverse processes. H The hind part.

FIG. II.

- A Foramen. BB The articulation with the os occipitis. C The fore part.
 DD The transverse processes. EE The foramina for the cervical arteries.
 F The hind part.

FIG. III.

THE second vertebra.

- A Processus dentatus. B The articulation with the first vertebra.
 C A lower process. D Processus transversus. E Processus obliquus.
 F Processus spinalis.

FIG. IIII. FIG. V.

THE fourth and fifth vertebræ

- AA Foramina. BB The bodies of the vertebræ CCCC The oblique processes.
 DDDD The transverse processes with their foramina. EE Processus spinales.

FIG. VI.

THE lowest vertebra of the neck.

- A Foramen. B The body. CC Oblique processes.
 DD Transverse processes. E The spinal process.

FIG. VII. FIG. VIII.

THE sixth and seventh vertebræ of the back.

- AA The bodies. BBBB The oblique processes which articulate together.
 CCCC The transverse processes. DDD The other oblique processes.
 EE The spinal processes.

FIG. IX.

THE lowest vertebra of the back.

- A The body. B The articulation of the lowest rib. C The oblique processes.
 D The transverse processes. E The spinal process.

FIG. X. FIG. XI.

THE third and fourth vertebræ of the loins.

- AA The bodies that joyn together. BBBB The oblique processes that joyn together.
 CCCC The transverse processes. DD The spinal processes.
 EE Oblique processes.

FIG I

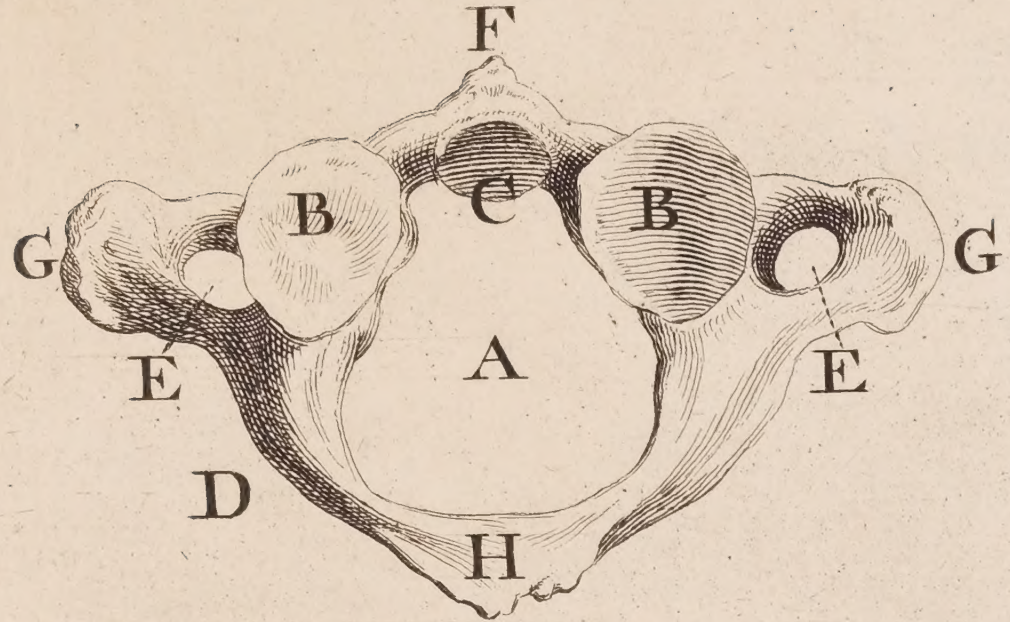


FIG II

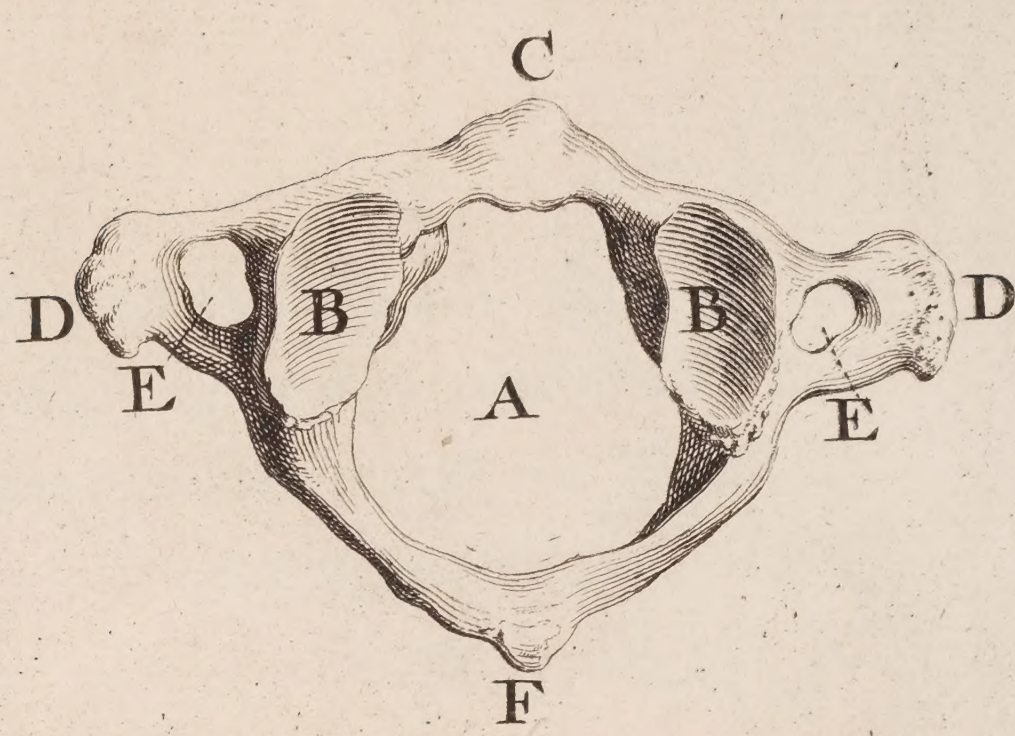


FIG III

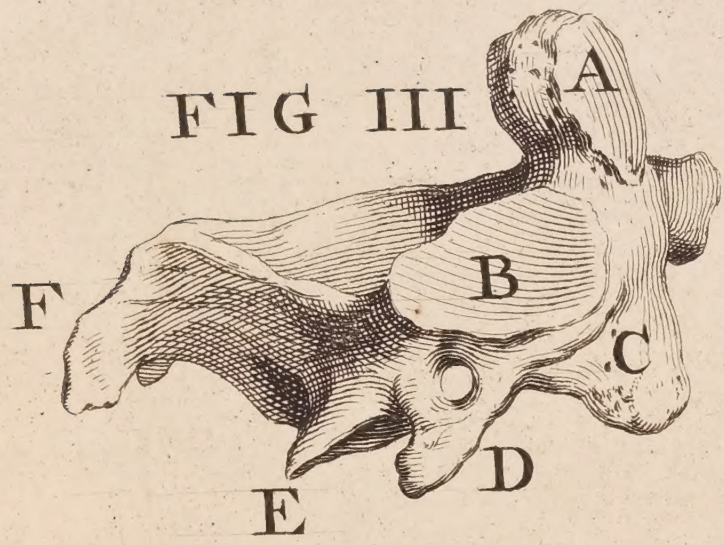


FIG VI

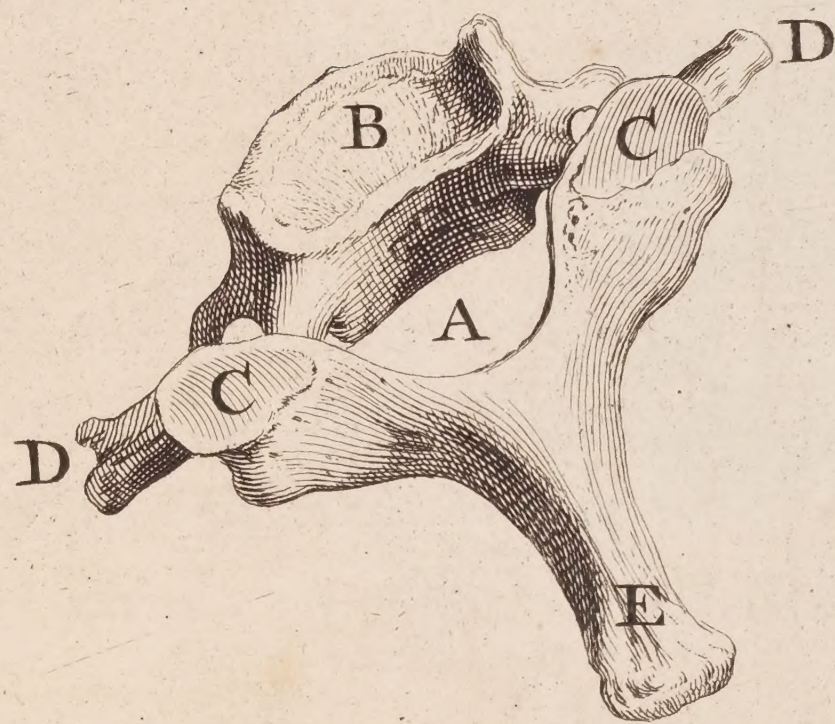


FIG IIII

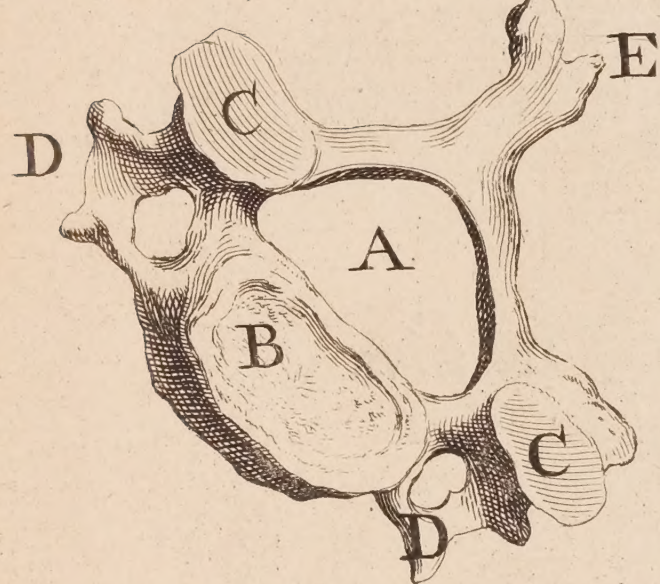


FIG V

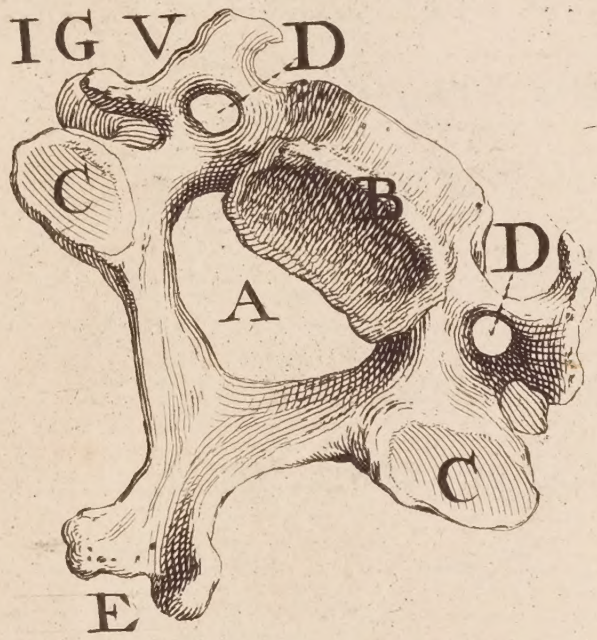


FIG VII

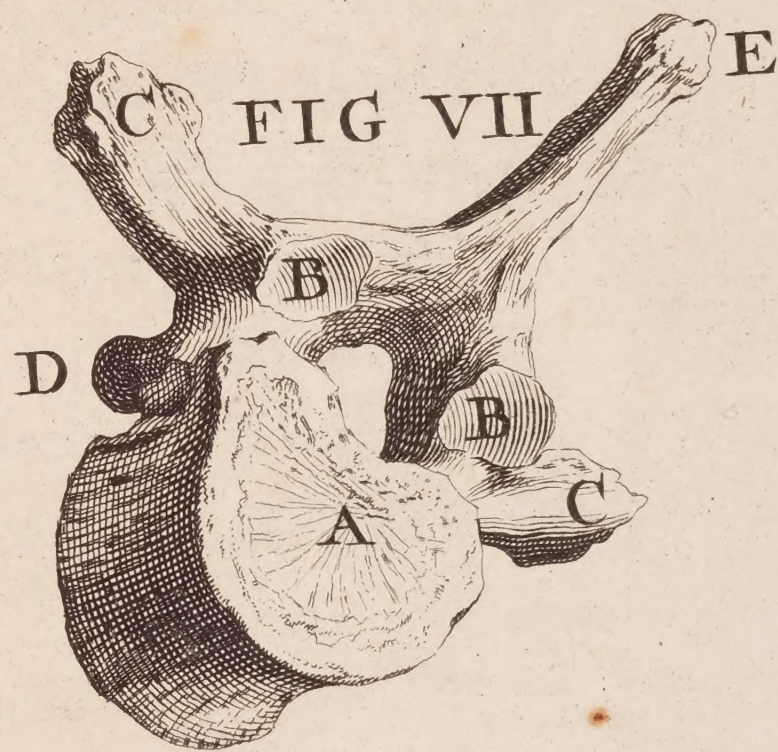


FIG VIII

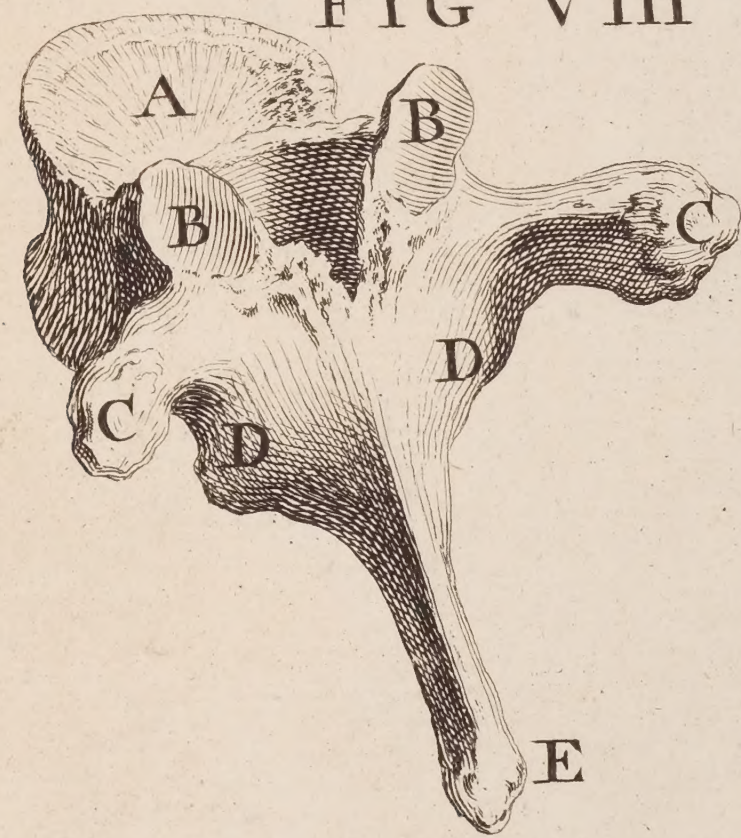


FIG X

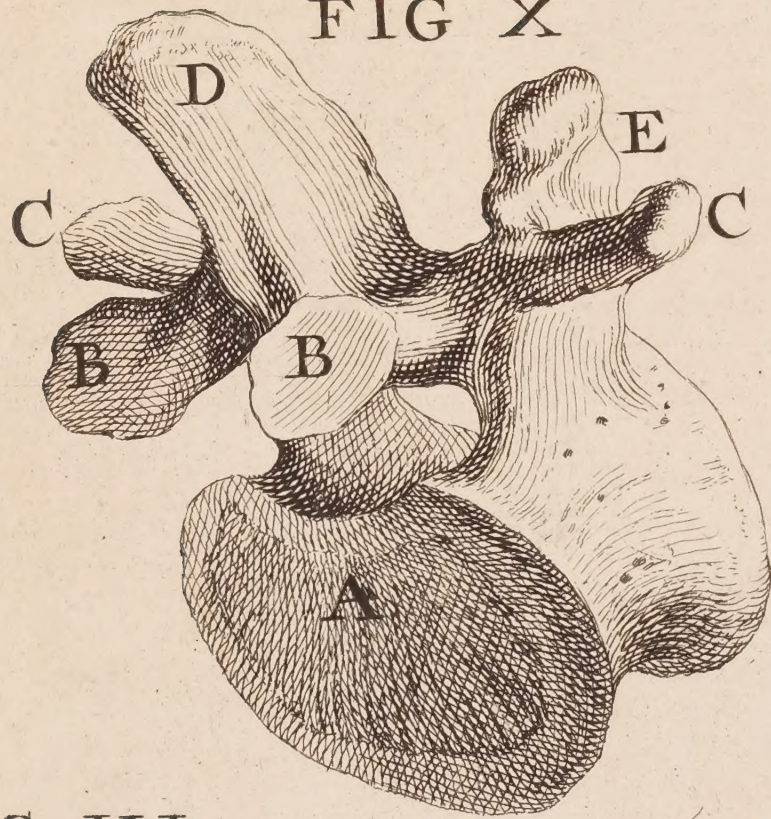


FIG XI

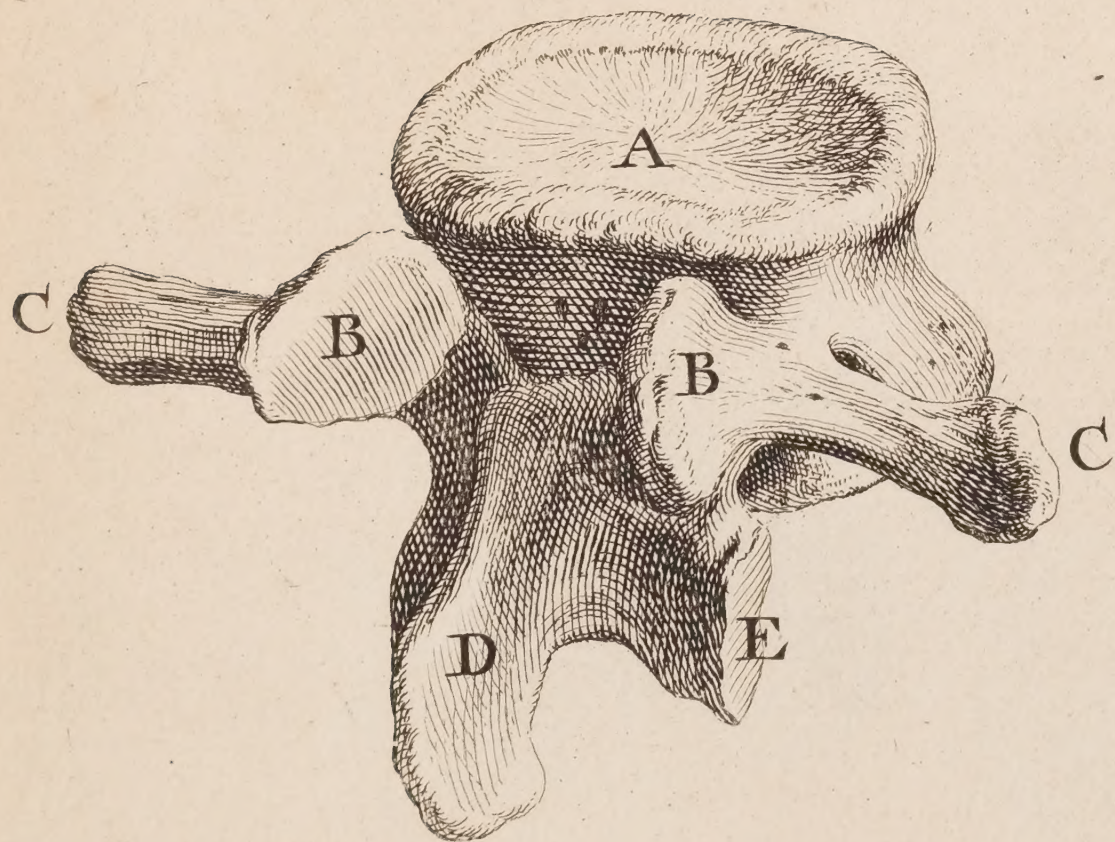


FIG IX

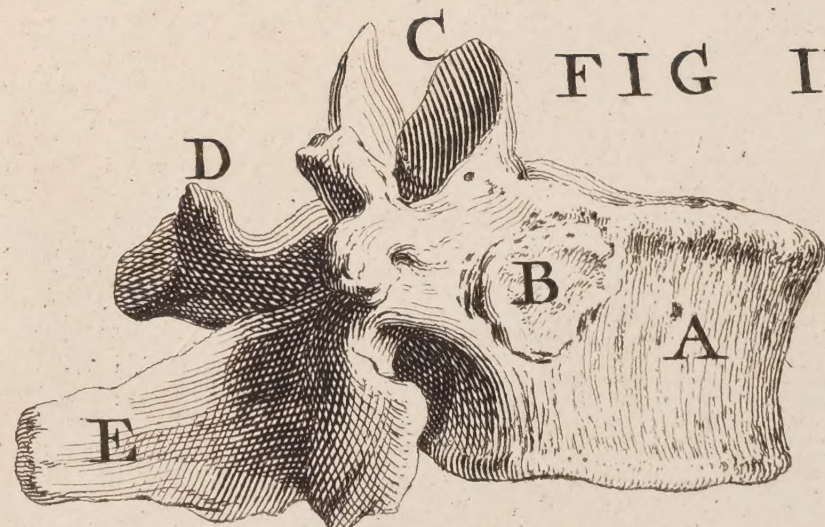


TABLE XII.

FIG. I.

THE last vertebra of the loins.

- A *The under side of its spongy body.*
- BB *The inferior oblique processes.*
- C *One of the superior oblique processes.*
- DD *The transverse processes.*
- E *The spinal process.*

FIG. II.

THE foreside of the os sacrum.

- 1, 2, 3, 4, 5, 6. *Parts of the os sacrum, which in young subjects are distinct bones.*
- A *That part of the os sacrum, which articulates with the spongy body of the lowest vertebra of the loins.*
- BB *Two processes of the os sacrum, which articulate with the inferior oblique processes of the last vertebra of the loins.*
- C *That part of the os sacrum, which articulates with the os coccygis.*
- D *That part of the os sacrum, which joins with the os innominatum.*
- EE, &c. *Foramina for the exit of the nerves.*

FIG. III.

THE back side of the os sacrum.

- AA *The two processes, which articulate with the inferior vertebra of the loins.*
- B *That part which articulates with the os innominatum.*
- C *Remarkable rugæ & foramina.*
- DD *Two spinal processes.*
- EE, &c. *Foramina for the passage of the nerves.*
- F *The channel through which the medulla spinalis passes.*
- G *The end of that channel.*

FIG. IIII.

The external view of the os coccygis.

- 1, 2, 3, 4. *Shews its composition of four distinct bones in young subjects.*

FIG. V.

- 1, 2, 3, 4, 5. *The external view of the os coccygis, with part of the os sacrum.*

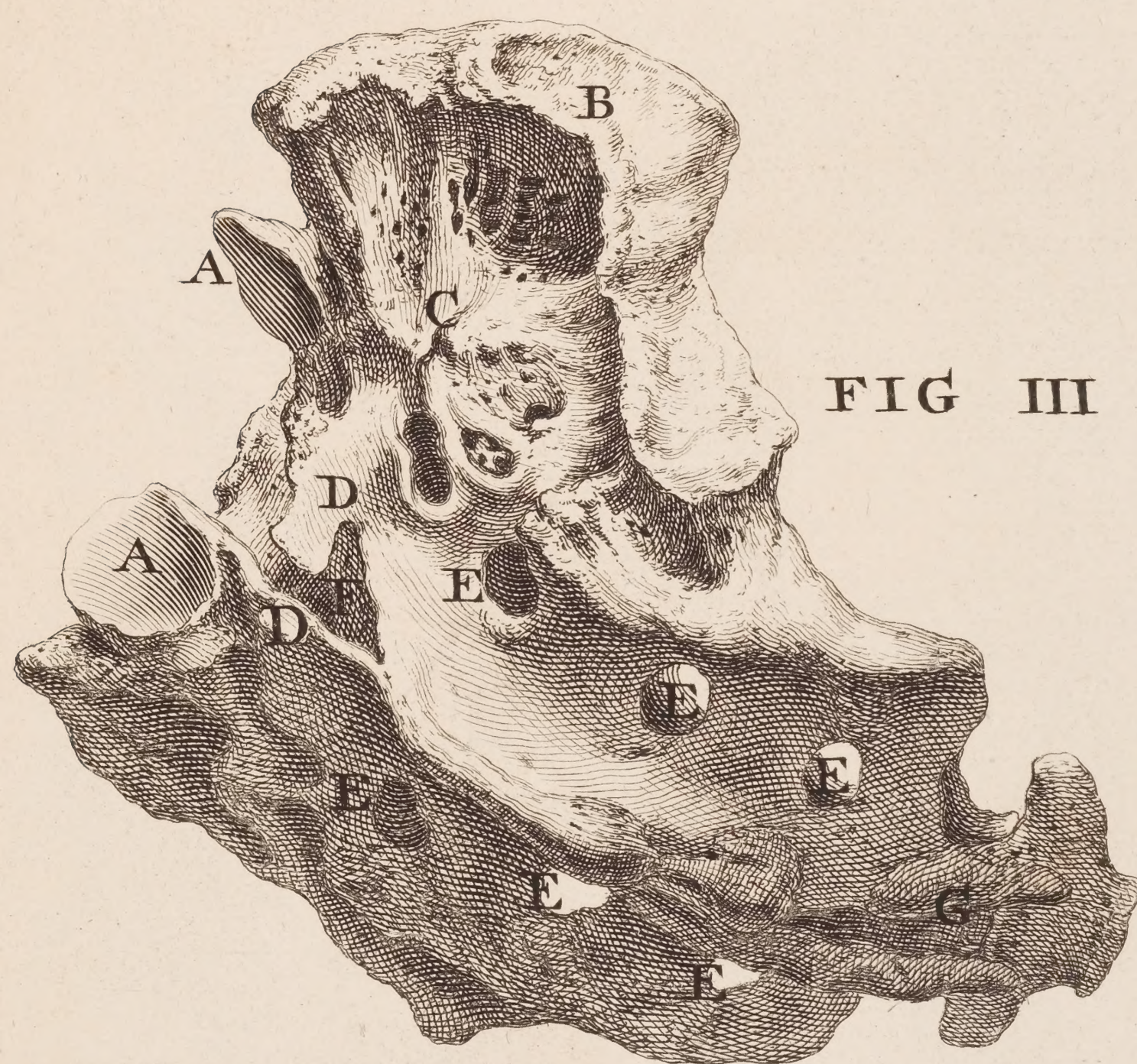
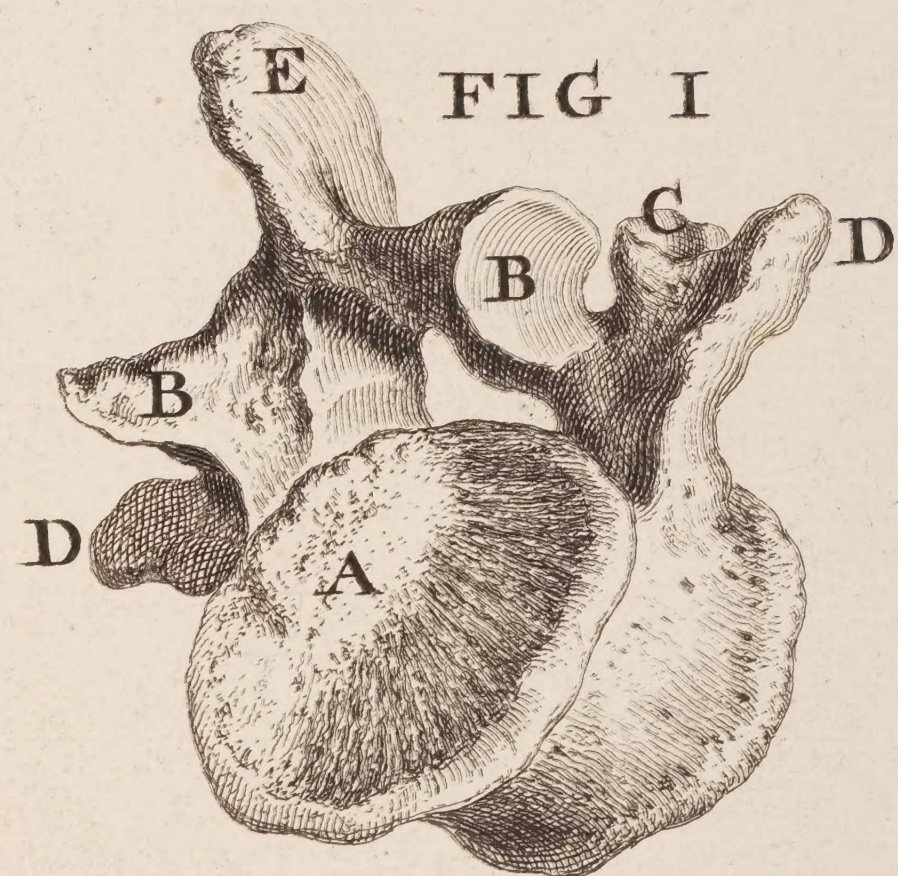
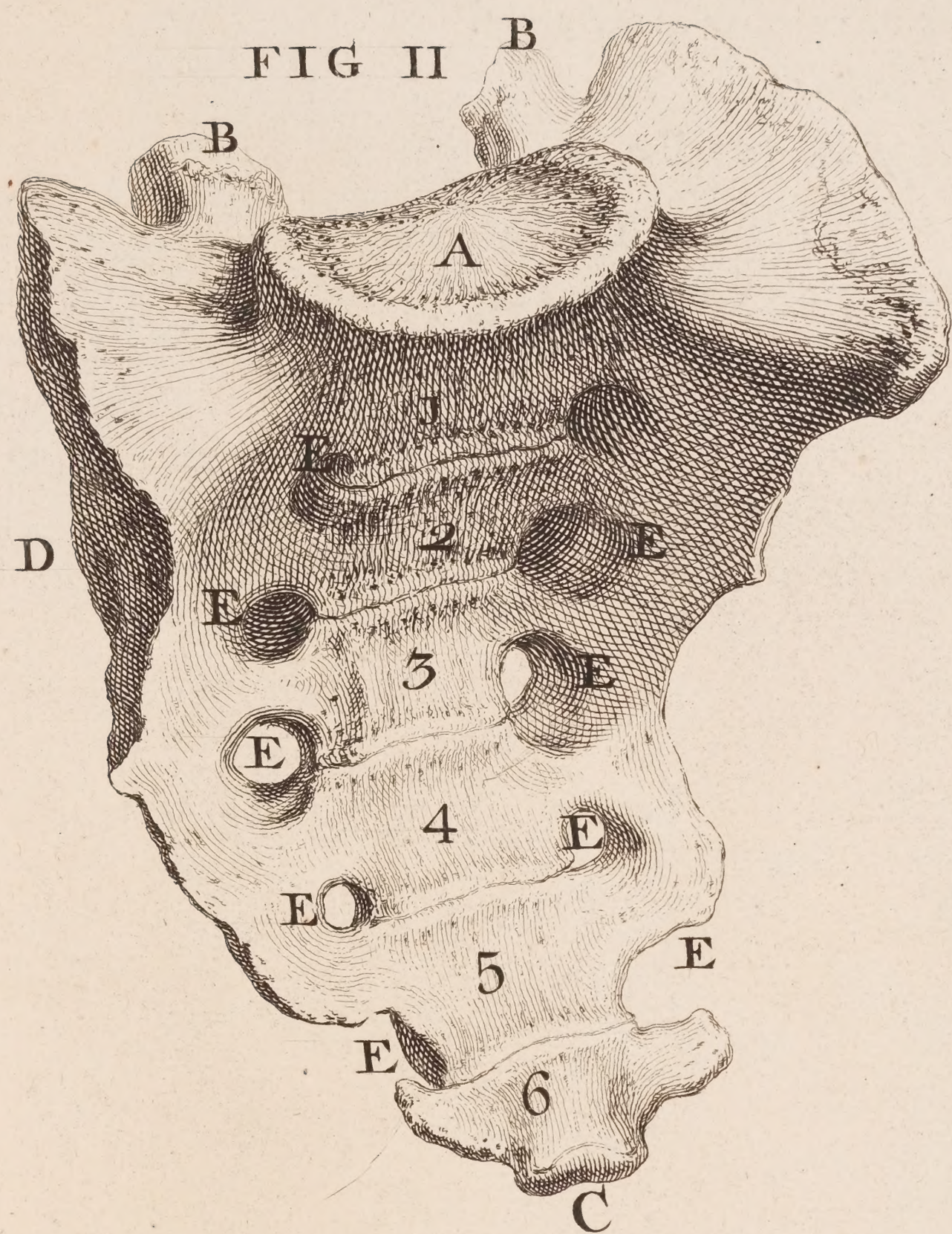


FIG IIII



FIG V



TABLE XIII.

FIG. I.

1, 2, 3, &c. SIXTEEN of the superior vertebræ sawed through to shew their spongy texture.

AA *The Channel in which the spinal marrow is contained.*

BB *The spinal processes of these vertebræ.*

C *A wire pass'd through the bodies of the vertebræ.*

FIG. II.

17, 18, &c. THE remaining vertebræ of the spine saw'd through.

AA *The channel for the medulla spinalis.*

BB *The spinal processes of these vertebræ.*

C *The wire passing through the bodies of the vertebræ.*

D *The os sacrum saw'd through its middle.*

FIG I

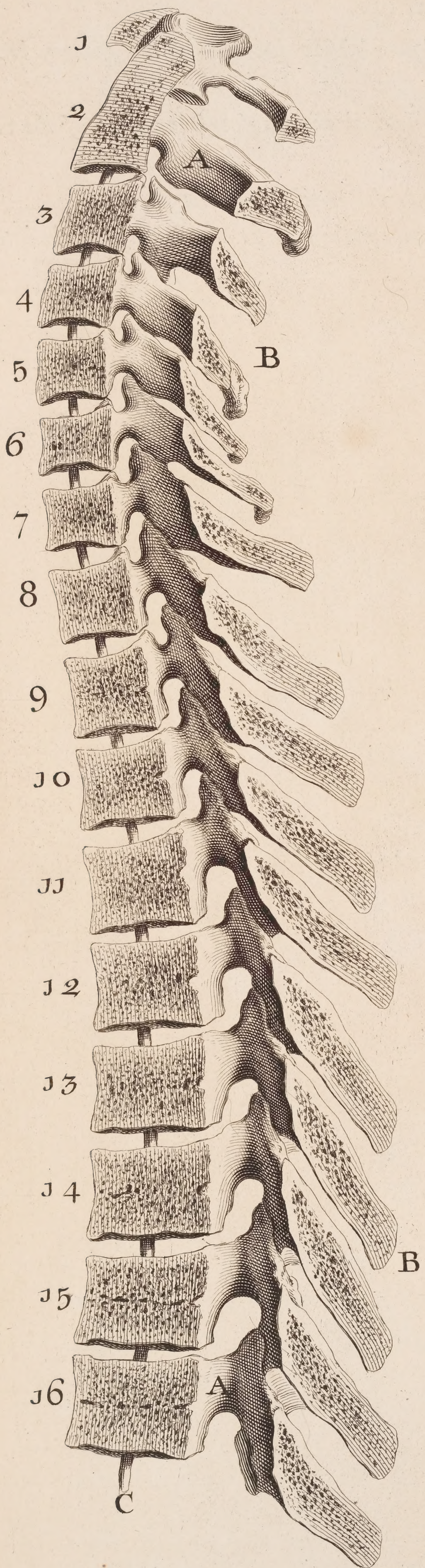


FIG II

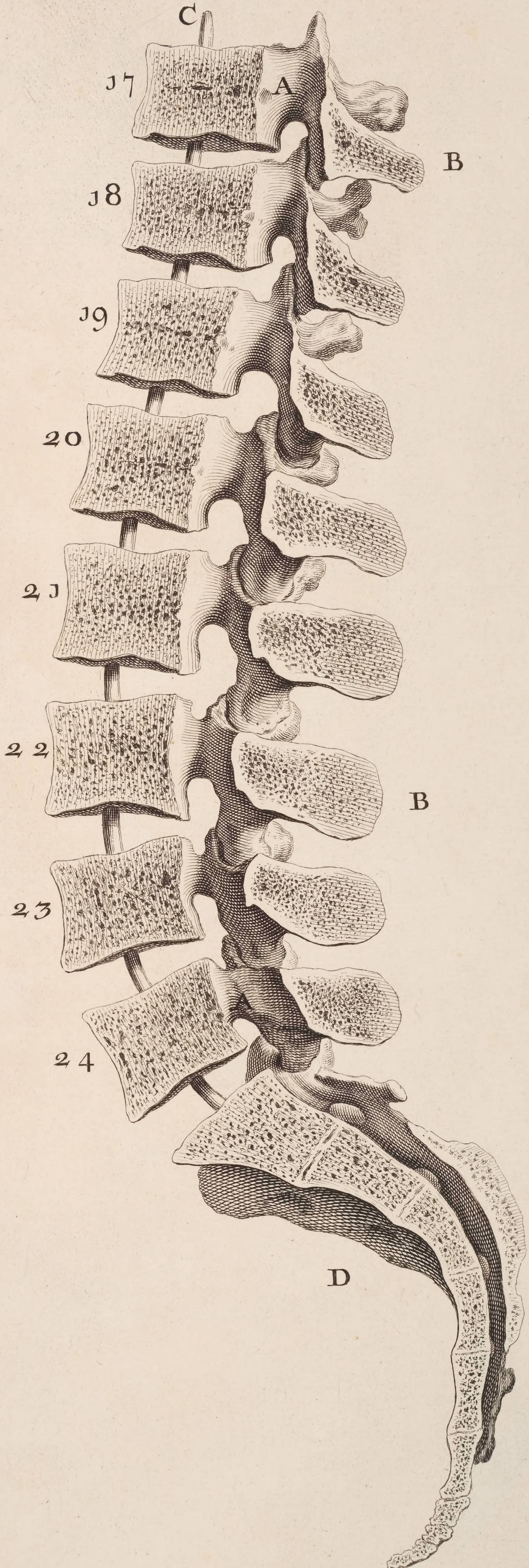


TABLE XIV.

FIG. I, II, III, IV, V, VI.

THE six upper ribs.

AAA, &c. *Those parts of the ribs, which articulate with the processes of the spongy bodies of the vertebræ.*

BBB, &c. *Those parts of the ribs, which articulate with the transverse processes of the vertebræ.*

CCC, &c. *The extremities of the ribs, which join to the cartilages of the sternum.*

DDD, &c. *Sinuses in the internal and inferior parts of the ribs for the passage of the intercostal vessels.*



XIV

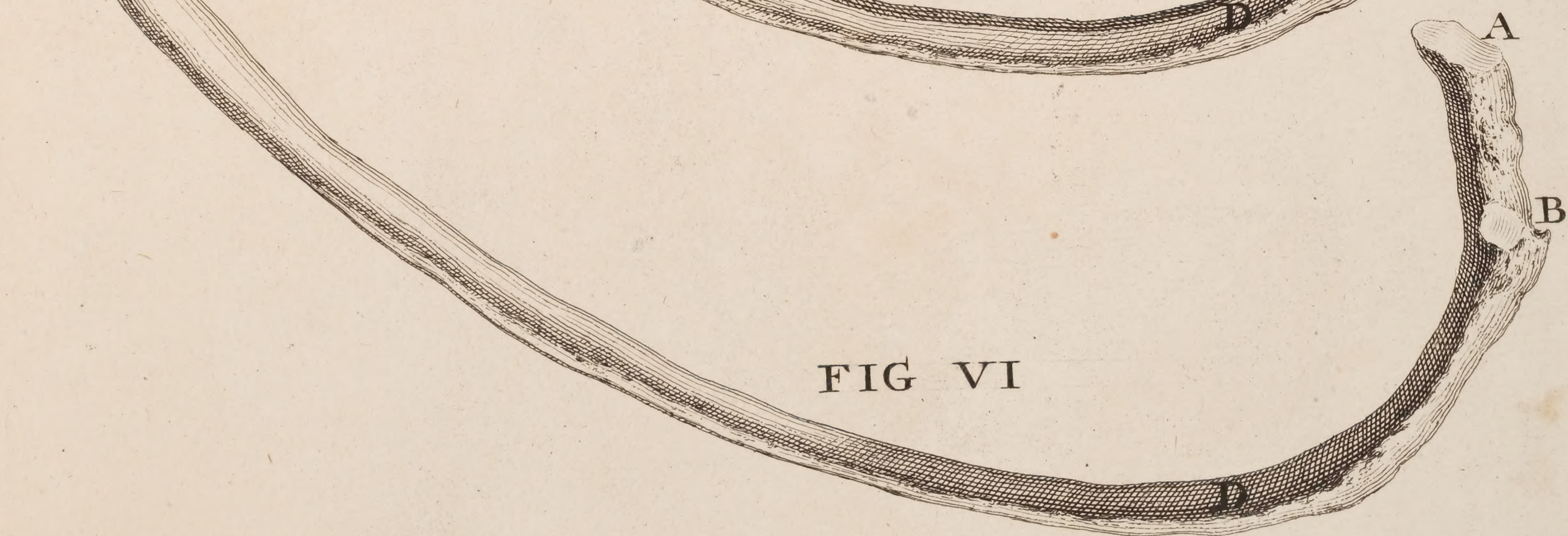
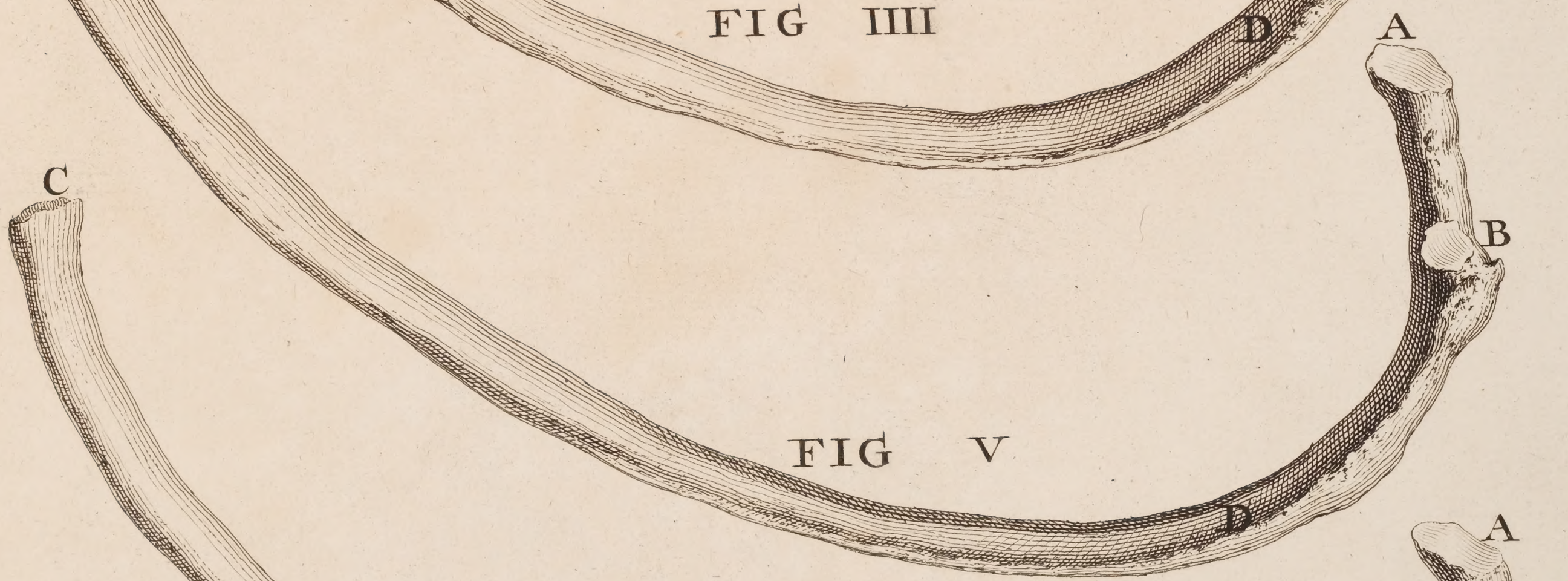
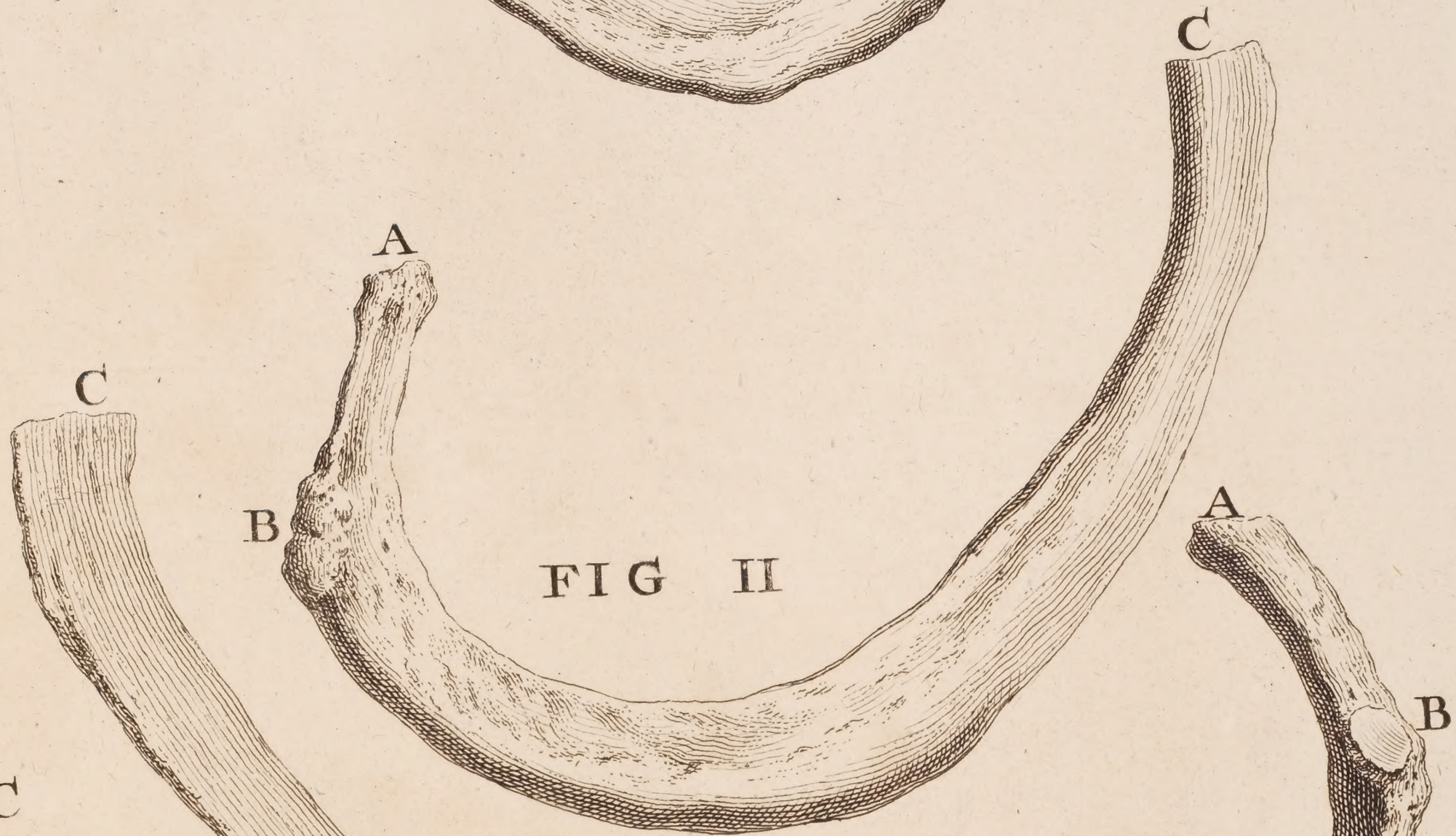


TABLE XV.

FIG. I.

THE sixth and seventh vertebra of the back, with part of the seventh rib.

- A A smooth sinus in the transverse process, into which a process of the sixth rib is received.
- B Another sinus, into which the end of the rib is received.
- C Part of the seventh rib.
- D The union of the seventh rib, with the transverse process of the vertebra.

FIG. II, III, IV, V, VI, VII.

THE six lowest ribs.

- AAA, &c. The ends which are articulated to the vertebræ.
- BBBB The processes which articulate with the transverse processes of the vertebræ.
- CCC, &c. The ends next the sternum which join to the cartilages.
- DDD, &c. The sinuses of the ribs, in which the vessels pass.

II DIT

III DIT

IV DIT

V DIT

VI DIT

VII DIT

XV

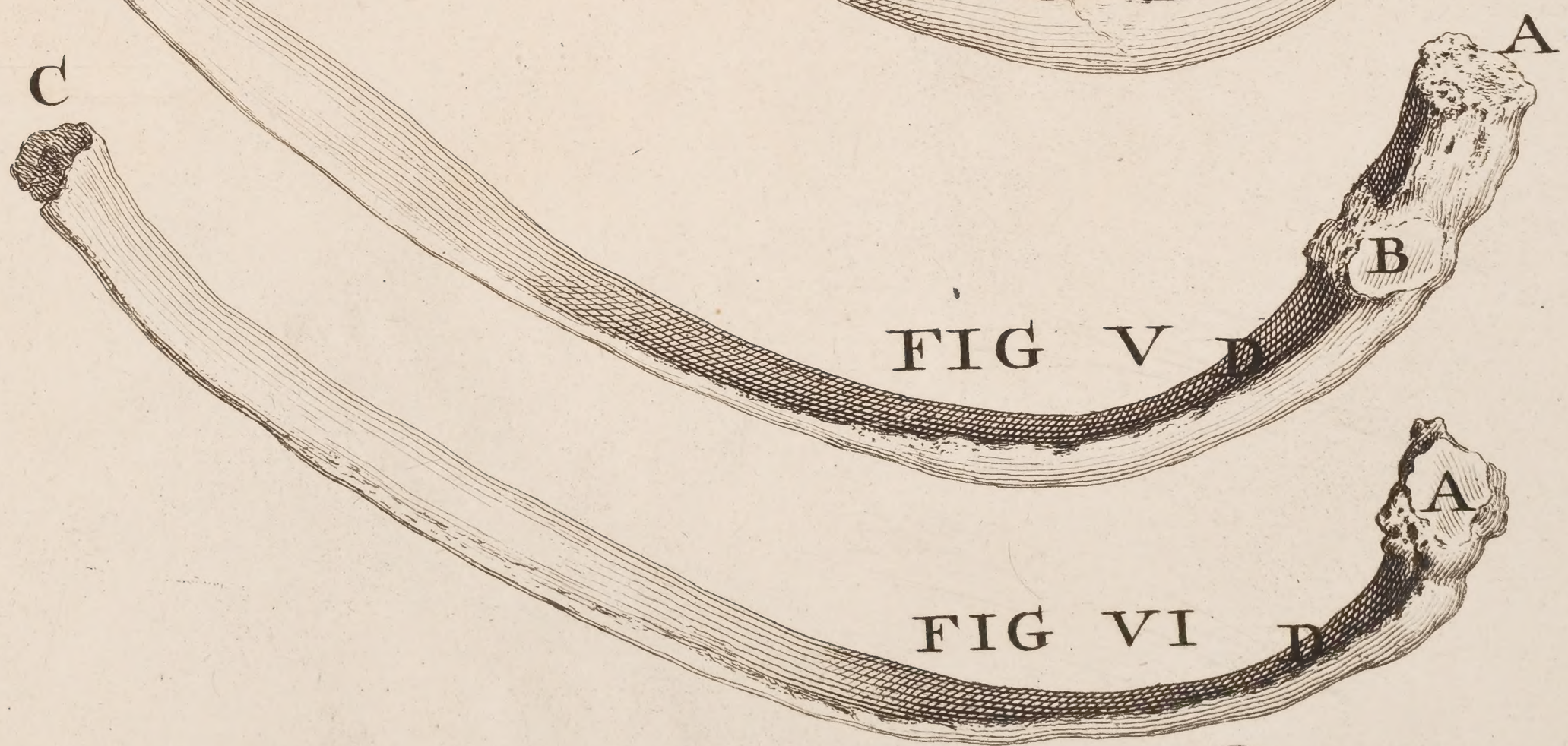
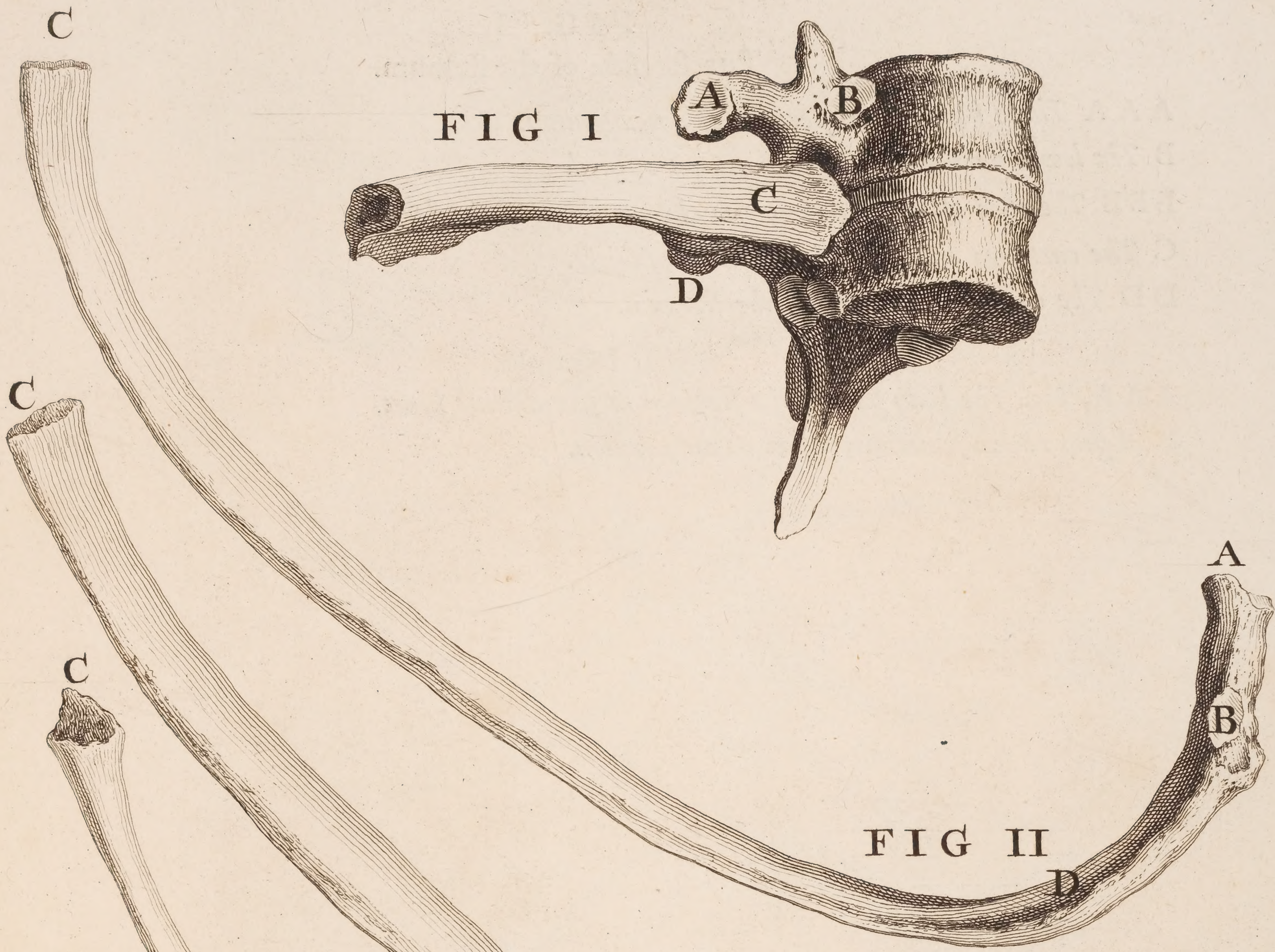
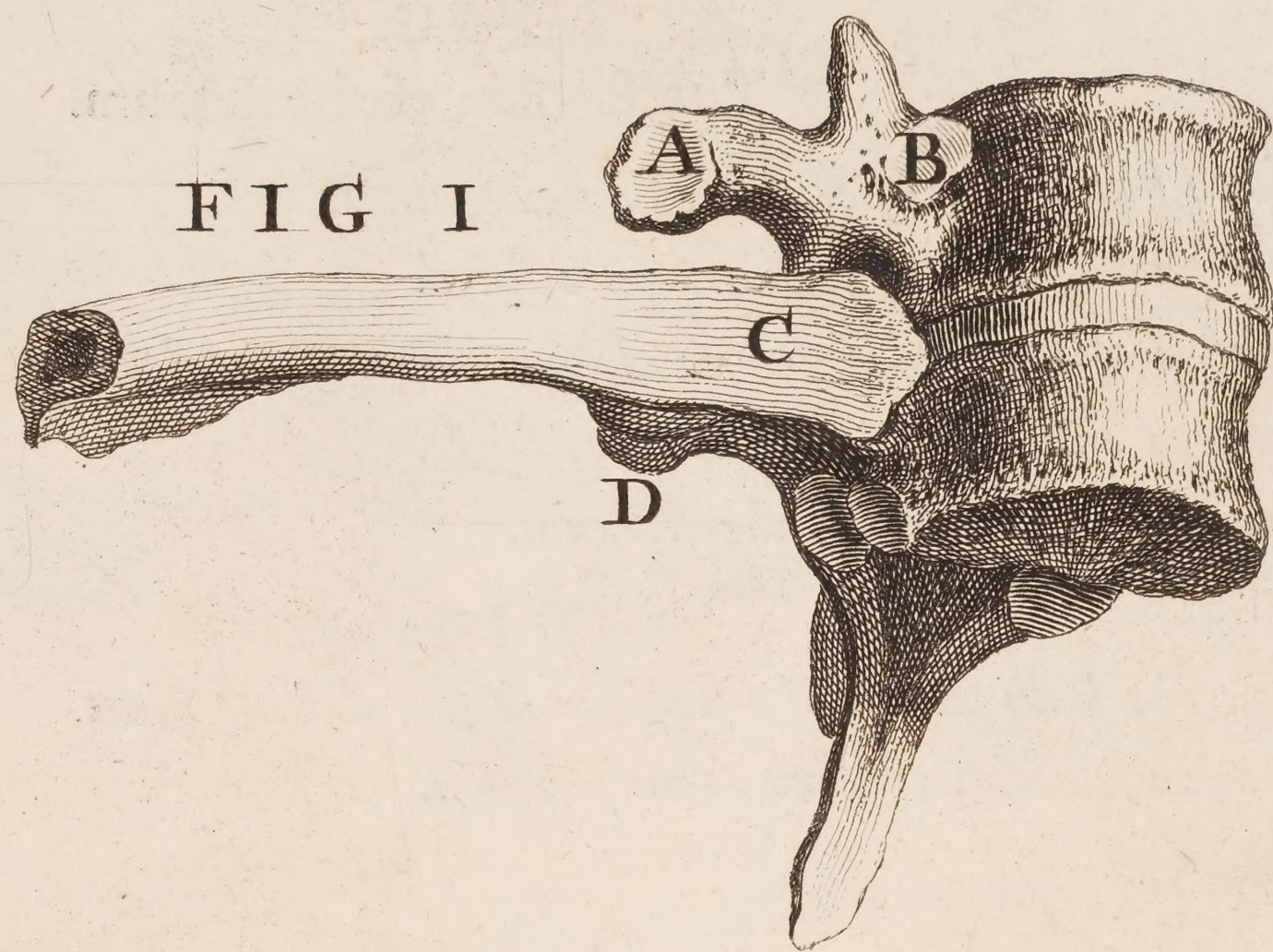


TABLE XVI.

FIG. I.

THE forefide of the ſternum.

A A A *Three bones of the ſternum of a young man.*

B *The lower part of the ſternum not yet ossified.*

BBB *The ends of the ribs joining to the cartilages of the ſternum.*

C *The cartilago ensiformis double in this ſubject.*

DD *The cartilaginous parts of the ſternum.*

FIG. II.

A A A, &c. *The bony part of the ſternum in five diſtinct bones.*

B *A perforation ſometimes found in the ſternum.*

FIG I

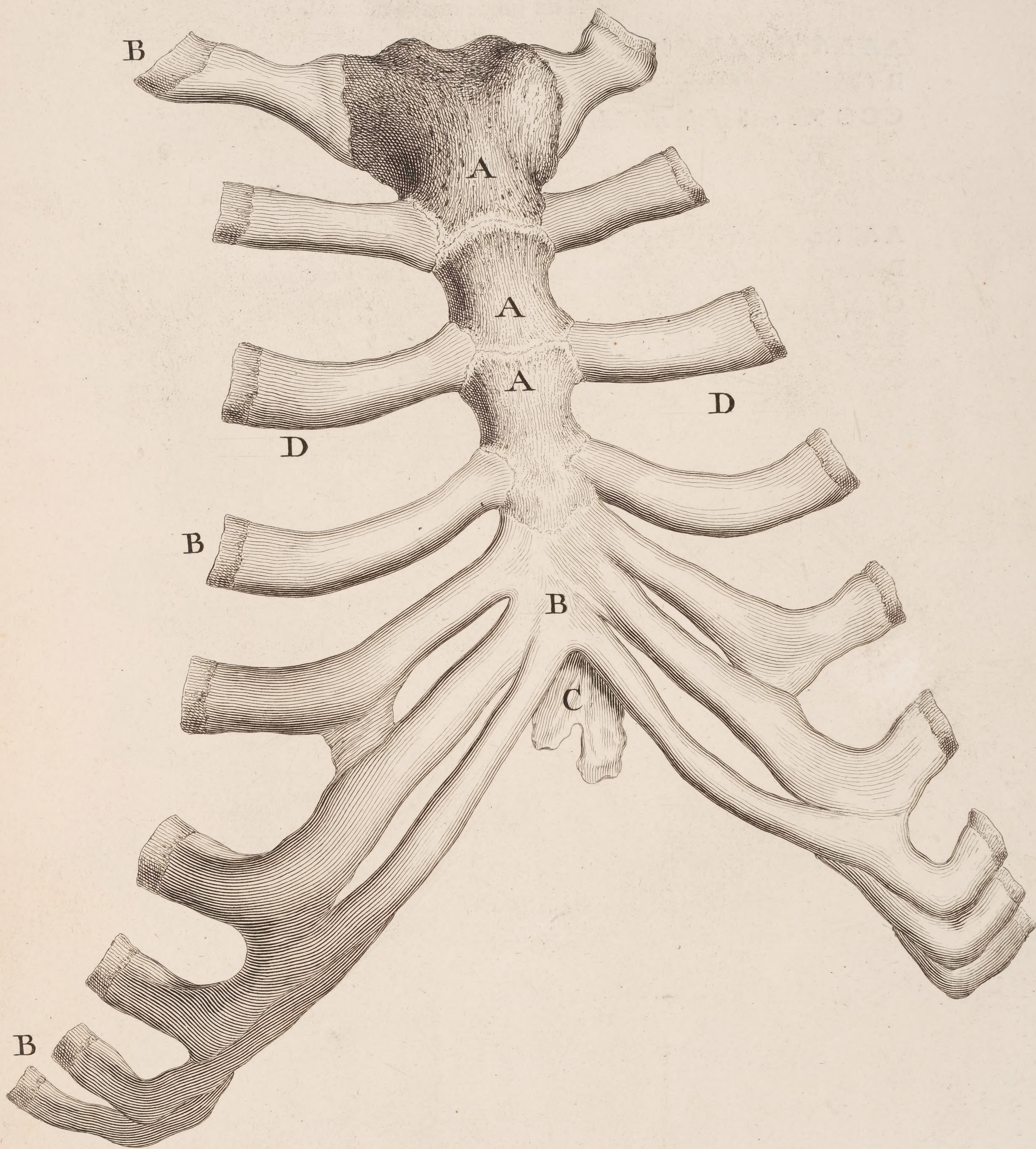


FIG II

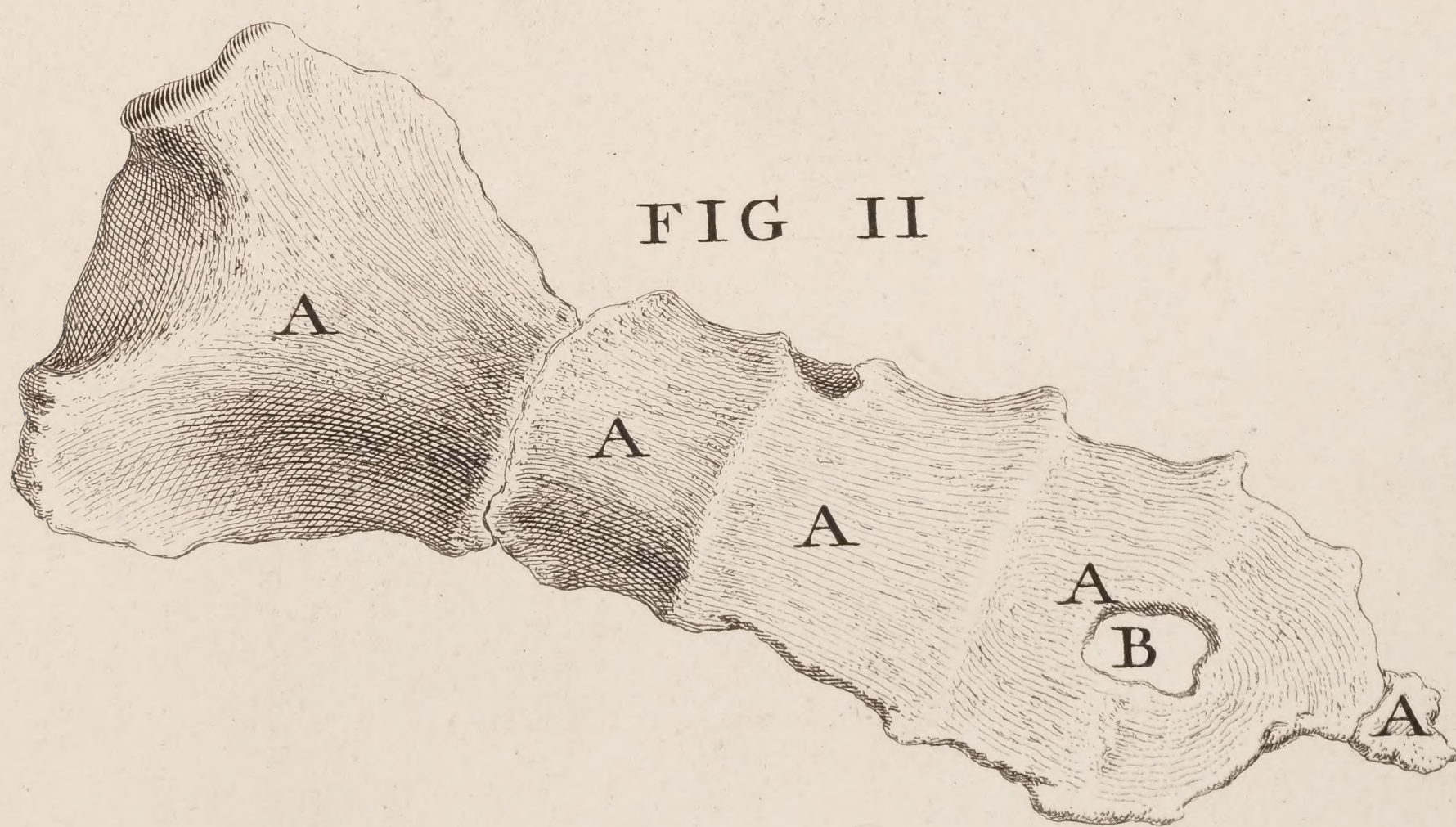


TABLE XVII.

FIG. I.

THE inside of the sternum.

AAAA *Four distinct bones.*

B *Cartilago ensiformis.*

CCC *The ends of the ribs joining to the cartilages of the sternum.*

FIG. II.

THE external view of part of another sternum.

AA, &c. *Five distinct bones of the sternum.*

B *One cartilage dividing to two ribs, which is not a very uncommon lusus naturæ.*

C *An imperfect cartilage.*

D *A perforated cartilago ensiformis.*

FIG I

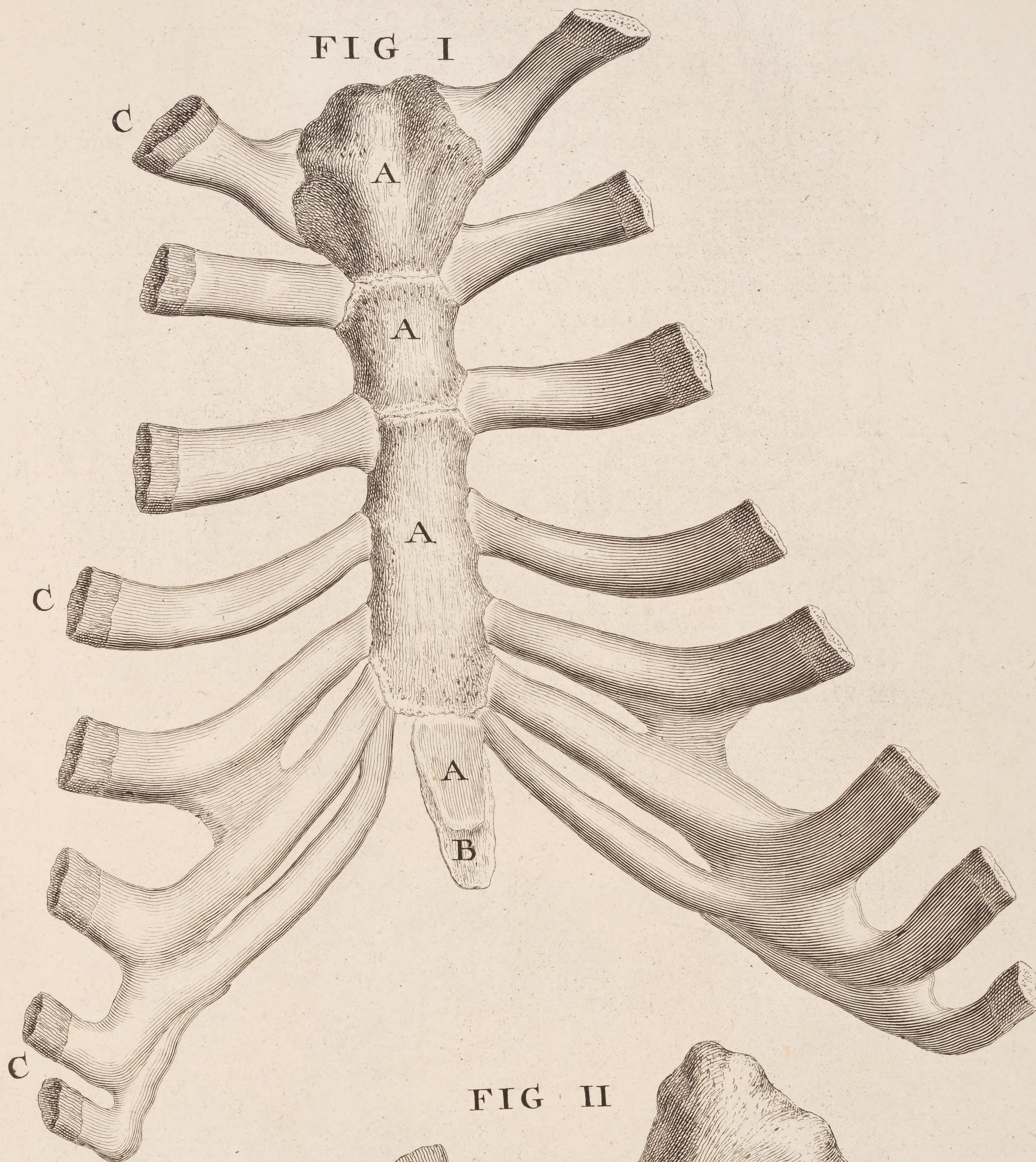


FIG II

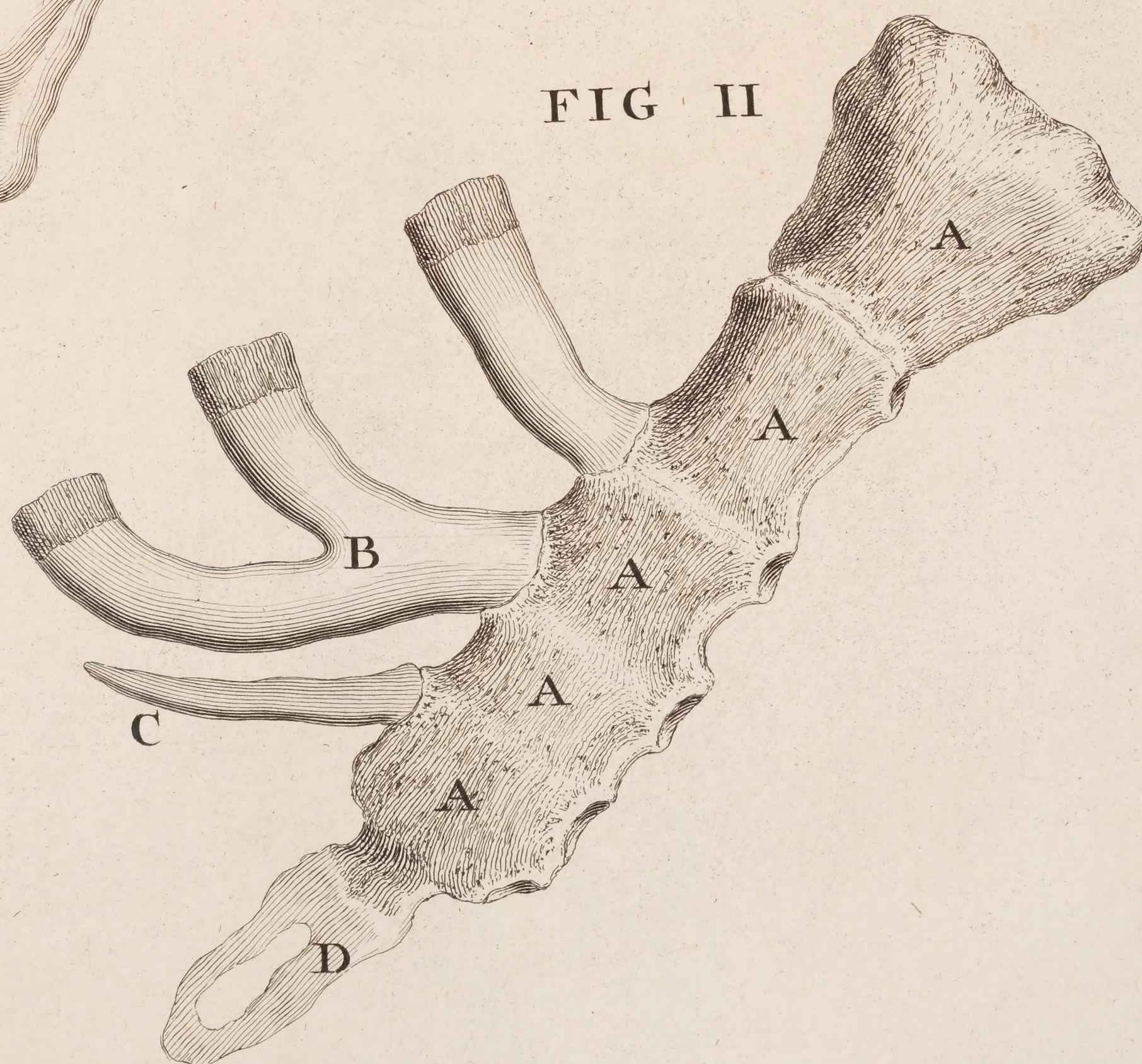


TABLE XVIII.

FIG. I.

THE outward view of the ossa innominata.

- A *The external part of the os ilium.*
- B *The obtuse process of the os ilium.*
- CC *The part of the acetabulum or socket of these bones, which is covered with a cartilage for the motion of the os femoris.*
- D *A sinus in the acetabulum, in which is lodged the lubricating gland of this joint, and in which the ligamentum teres lies secure from being hurt by the motion of the os femoris.*
- E *That part of the os pubis, which joins the other os pubis.*
- F *The acute process of the os ilii.*
- G *The obtuse process.*
- H *That part of the os ilii, which joins the os sacrum.*
- I *The foramen of the ossa innominata.*

FIG. II.

THE internal view of the ossa innominata.

- A *The inward and concave side of the os illii.*
- B *The part which joins the os sacrum.*
- C *A roughness for the origin of ligaments and tendons.*
- D *The obtuse process.*
- E *The acute process of the os ischii.*
- F *The foramen of the ossa innominata.*
- G *That part of the os pubis, which joins the other os pubis.*

XVIII

FIG I

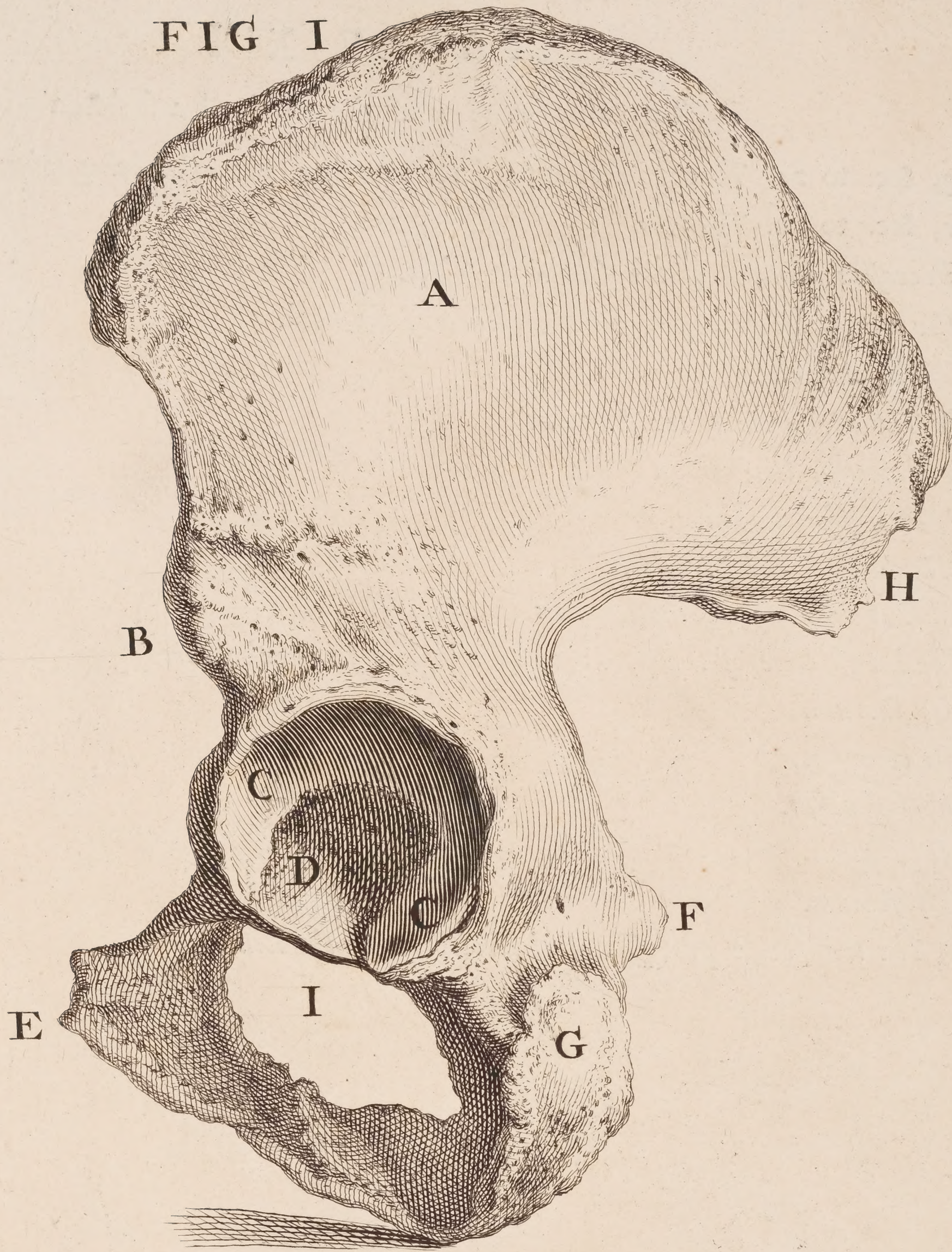


FIG II



TABLE XIX.

THE anterior view of the trunk of a skeleton.

2, 3, &c. to 24. *Three and twenty of the vertebræ, the atlas being taken off with the skull.*

1, 2, &c. to 12. *The ribs.*

A *Processus dentatus of the second vertebræ.*

B *The transverse processes of the vertebræ of the neck.*

CC *The clavicles.*

DD *The acetabula of the scapulæ.*

EE *Processus Coracoides.*

FF *Processus acromion.*

G *The bone of the sternum.*

HH *The cartilages of the sternum.*

I *The lowest bone of the sternum, to which is joined the cartilago ensiformis.*

K *Os sacrum.*

L *Os coccygis.*

MM *Ossa illia.*

N *Ossa pubis.*

O *Os ischium.*

PP *The transverse processes of the vertebræ of the loins.*

XIX

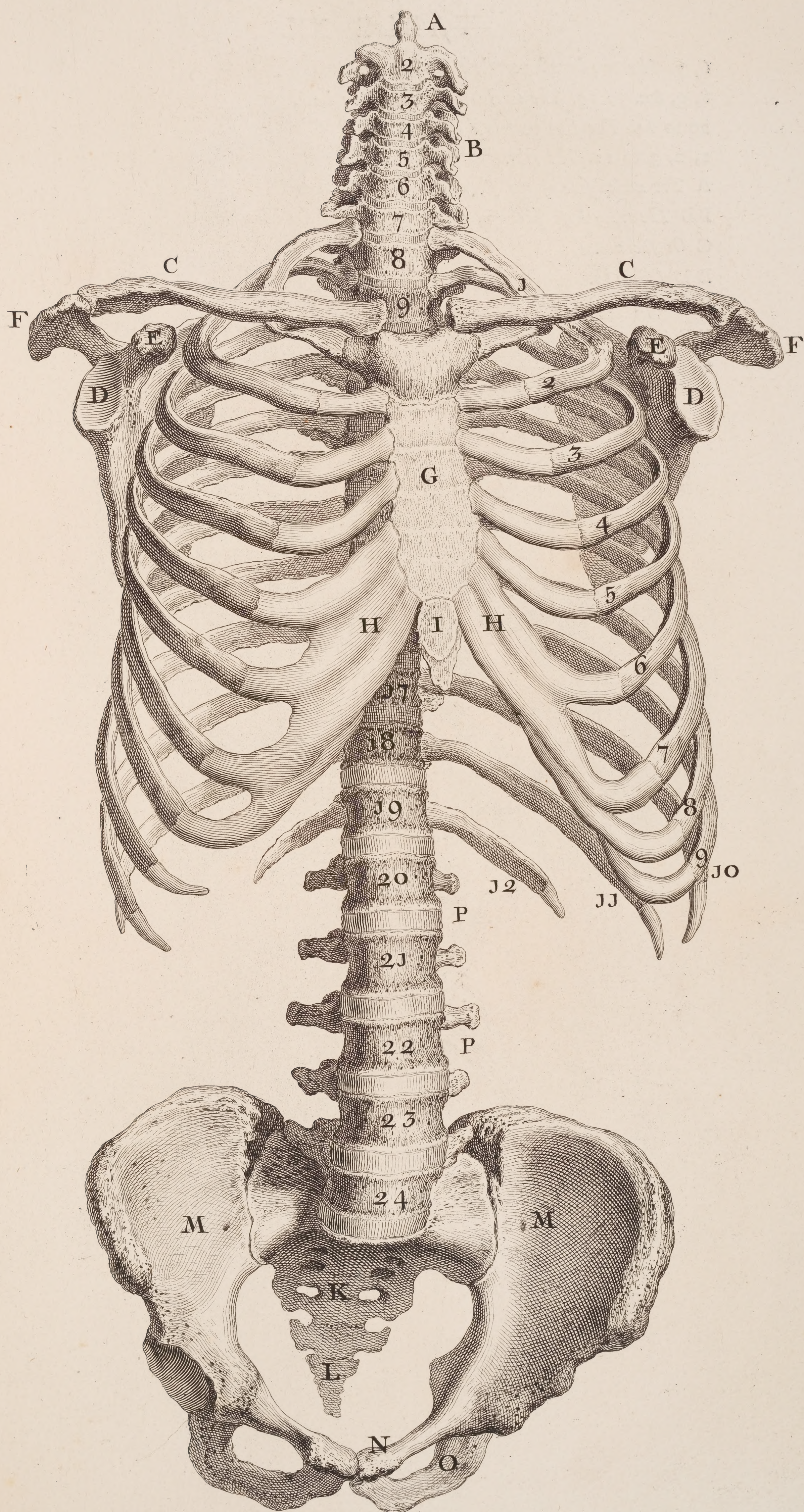


TABLE XX.

- 6, 7. *The two lowest vertebræ of the neck.*
8, 9, &c. to 19. *The twelve vertebræ of the back.*
20 to 24. *The five vertebræ of the loins.*
1, 2, 3 to 12. *The ribs.*
A *The under side of the sternum.*
BB *The transverse processes of the vertebræ of the loins.*
C *Os sacrum.*
DD *Os ilia.*
EE *Os ischia.*
FF *The acute processes.*
G *Os pubis.*

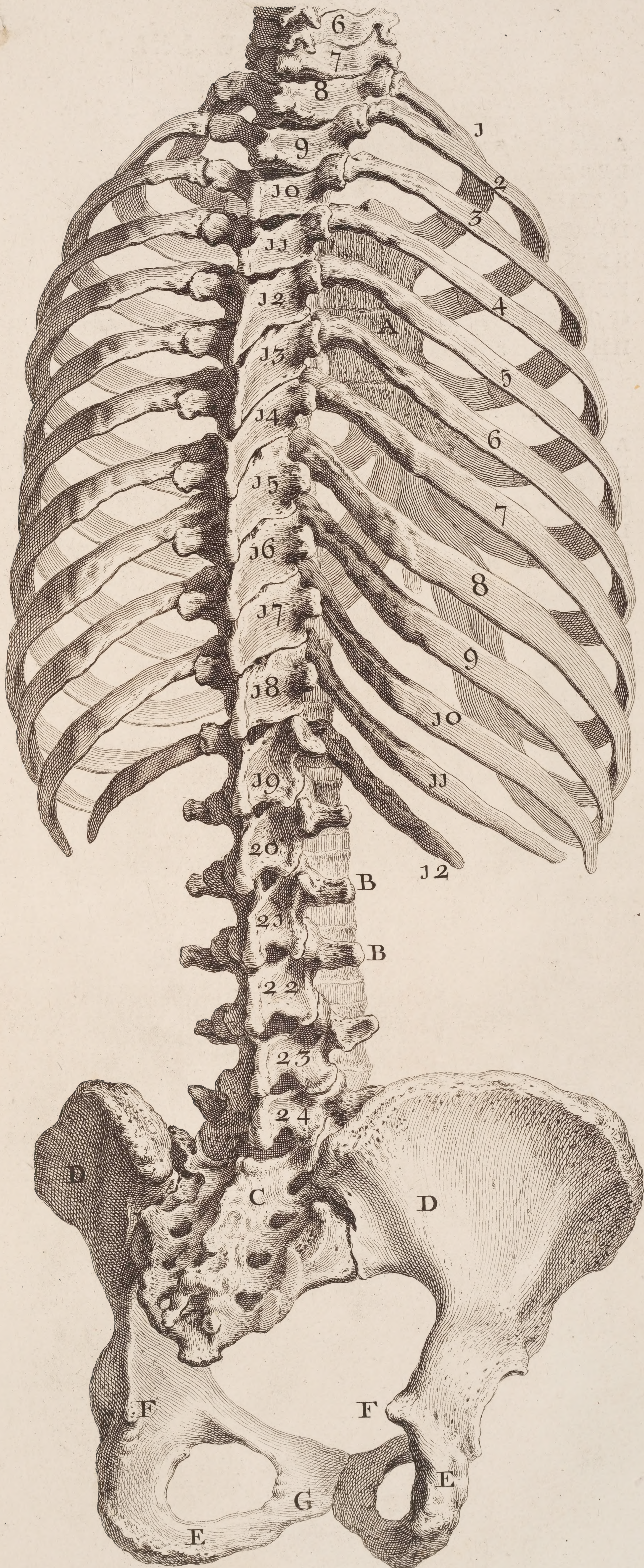


TABLE XXI.

FIG. I.

A side view of the vertebræ of the spine.

- A *The spinal processes of the vertebræ of the neck.*
- BBB *The spinal processes of the vertebræ of the back and loins.*
- C *The os sacrum.*
- DD *The transverse processes of the six lowest vertebræ of the neck.*
- EE *The transverse processes of the vertebræ of the back.*
- FF *Parts of the vertebræ to which the ribs are articulated.*
- G *One of the foramina through which the nerves pass from the spinal marrow.*
- HH *The intervening cartilages.*

FIG. II.

The fore-view of the vertebræ of the spine, the lower end upwards.

- A *Os sacrum.*
- B *The foramina through which the nerves pass from that bone.*
- CC *The transverse processes of the vertebræ of the loins.*
- DD *The transverse processes of the vertebræ of the back.*
- EE *The transverse processes of the six lowest vertebræ of the neck.*

FIG I



FIG II



TABLE XXII.

FIG. I.

THE convex side of the scapula.

- A A *The spine of the scapula.*
- B *Processus acromion.*
- C *Processus coracoides.*
- D *Acetabulum.*
- E *The dorsum scapulæ above the spine.*
- F *The superior costa of the scapula.*
- G G *Basis scapulæ.*
- H *The dorsum scapulæ below the spine.*
- I I *The inferior costa of the scapula.*
- K *The superior angle of the scapula.*
- L *The inferior angle of the scapula.*

FIG. II.

THE concave side of the scapula.

- A A *The roughnesses on the inside of the scapula.*
- B *The basis of the scapula.*
- C *That part of the processus acromion, to which the clavicle is articulated.*
- D *The spine of the scapula.*
- E *Processus coracoides.*
- F *The edge of the acetabulum scapulæ.*
- G *The neck of the scapula.*
- H *The superior costa of the scapula.*
- I *The superior angle of the scapula.*
- K *A semicircular sinus on the superior costa.*
- L *The inferior angle of the scapula.*
- M M *The inferior costa of the scapula.*

FIG. III.

THE upper surface of the clavicle.

- A *The end that is articulated with the processus acromion.*
- B *The end that is articulated with the sternum.*

FIG. IV.

THE under surface of the clavicle.

- A *The end that joins to the processus acromion.*
- B *A roughness for the origin of ligaments and muscular fibres.*
- C *The end that joins to the sternum.*
- D *A remarkable roughness.*

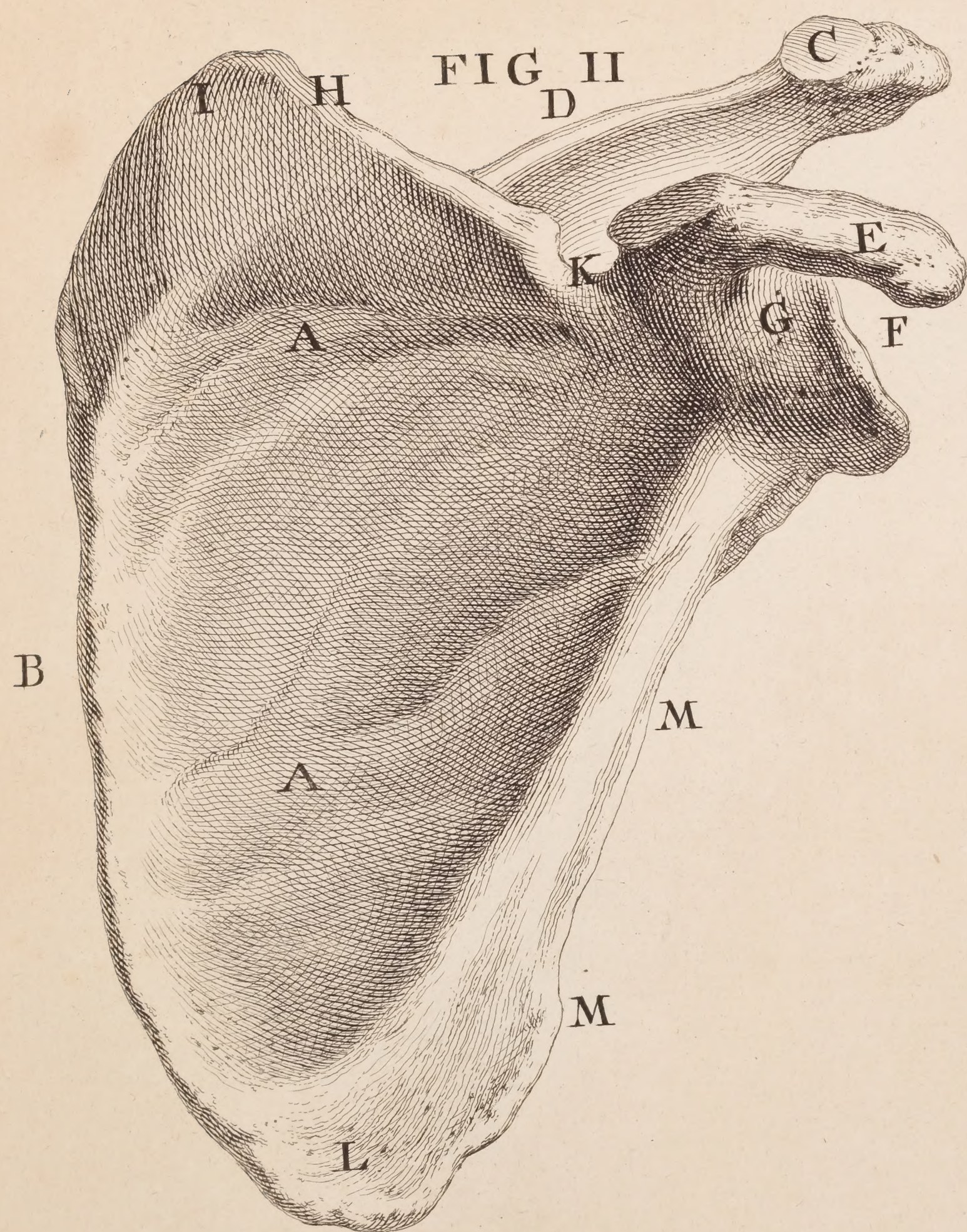
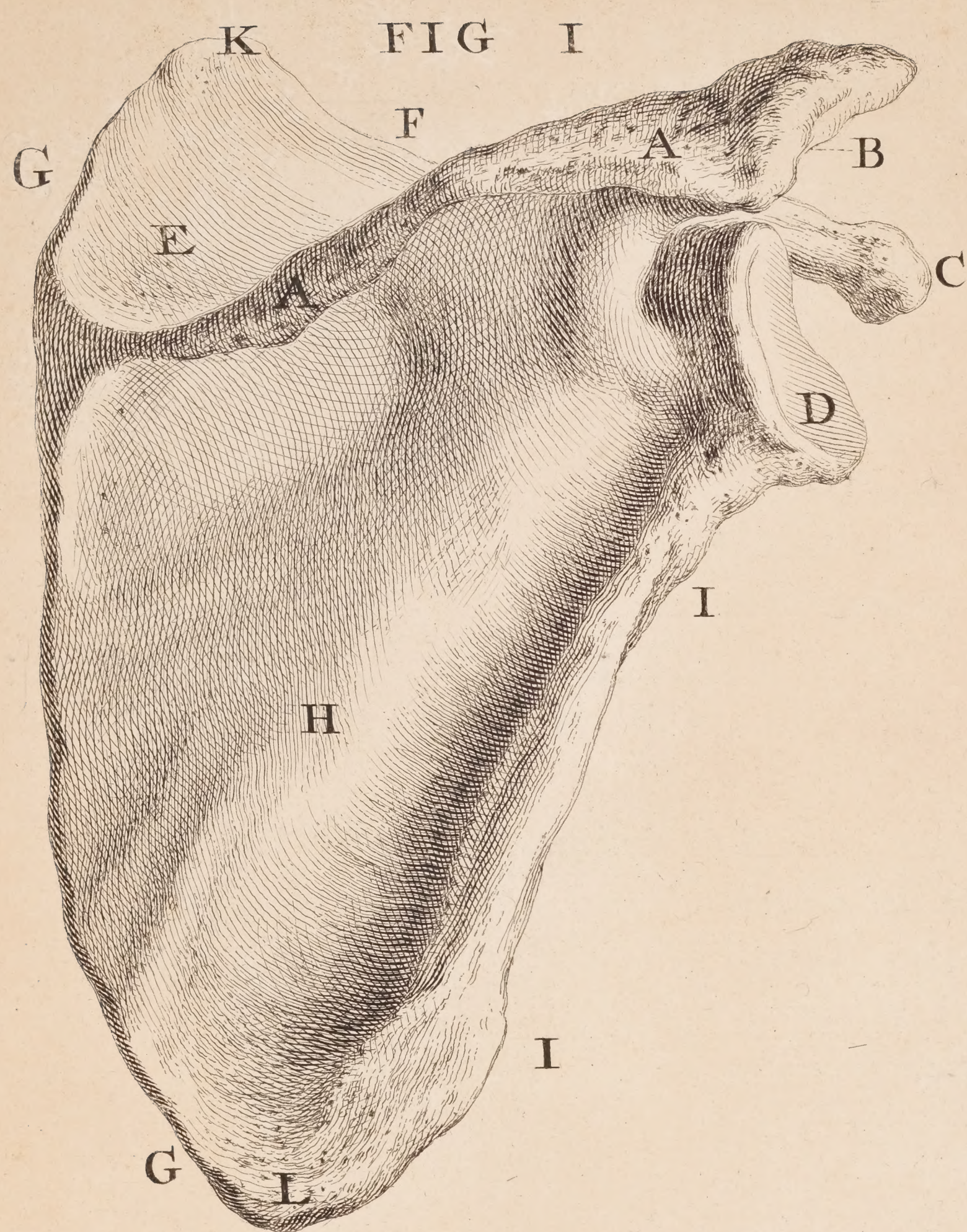


TABLE XXIII.

FIG. I.

THE forefide of the os humeri.

- A *The head of the os humeri.*
- B *A tubercle near the head of the os humeri for the insertion of muscles.*
- C *Another tubercle for the insertion of muscles.*
- D *The sinus in which one of the heads of the biceps lies.*
- E *A cavity which receives a process of the ulna.*
- F *The internal apophysis of the os humeri.*
- G *The external apophysis of the os humeri.*
- H *That part which articulates with the radius.*
- I *That part which articulates with the ulna.*

FIG. II.

THE outside of the os humeri.

- A *The Head of the os humeri.*
- B *A tubercle nigh the head of the os humeri for the insertion of muscles.*
- C *A cavity which receives the olecranon ulnæ.*
- D *The internal apophysis of the os humeri.*
- E *The external apophysis of the os humeri.*
- F *That part which articulates with the ulna.*

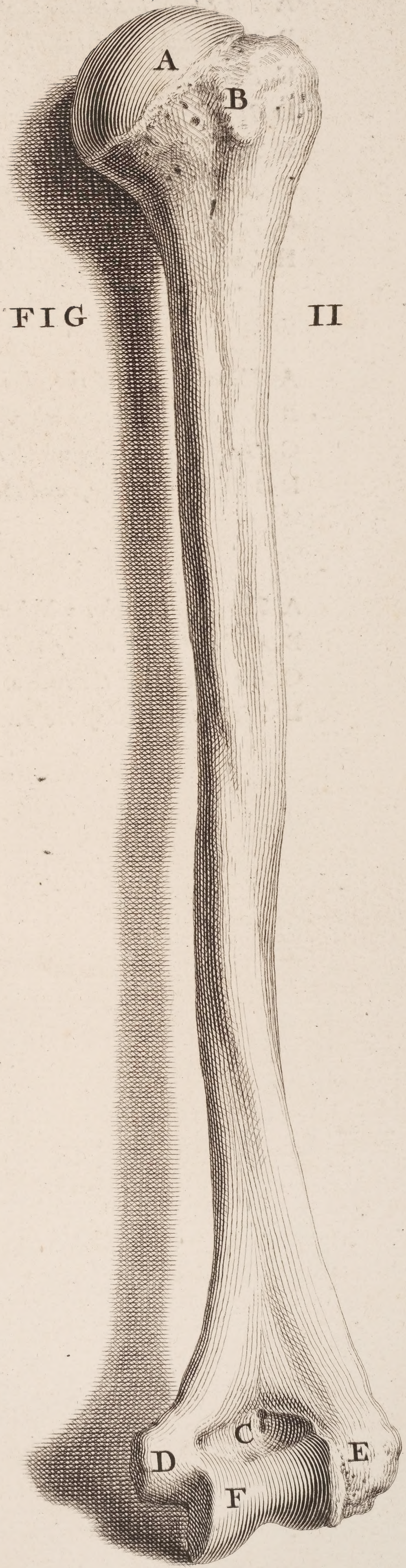
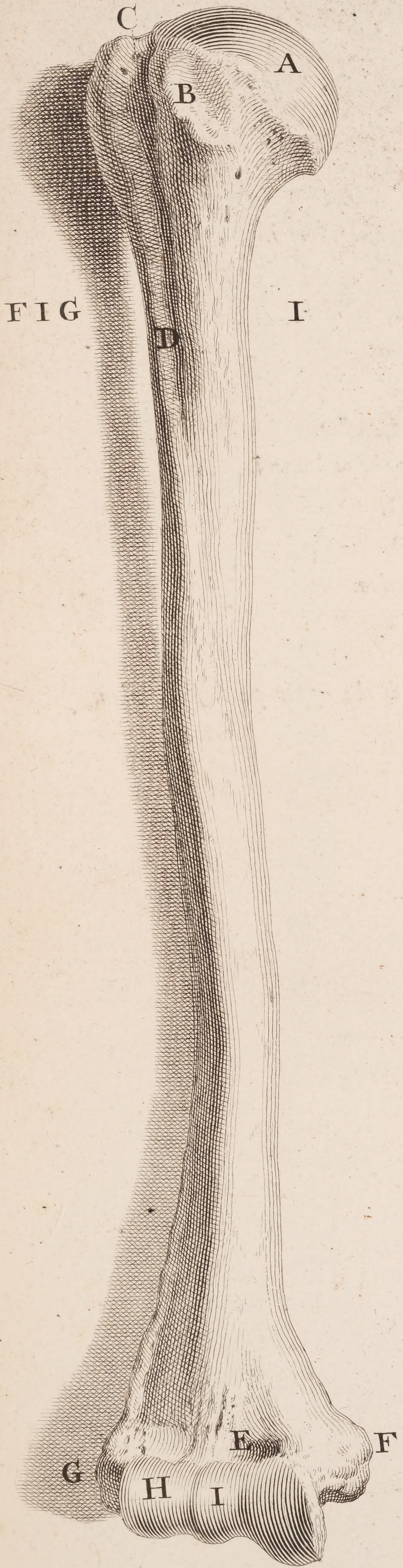


TABLE XXIV.

FIG. I.

THE radius and ulna.

- A *The end of the radius that receives the bones of the carpus.*
- B *The round end of the ulna which the radius turns upon.*
- C *Processus styloformis.*
- D *The space between the two bones that is fill'd up with a ligament.*
- E *The tubercle of the radius for the insertion of the biceps muscle.*
- F *A tubercle on the ulna for the insertion of the brachæus muscle.*
- G *The round end of the radius that turns upon the ulna.*
- H *Olecranon ulnæ, and the cavity which receives the os humeri.*

FIG. II.

THE ulna.

- A *The extremity of the ulna next to the carpus.*
- B *Processus styloformis ulnæ.*
- C *The smooth cavity which receives the head of the radius.*
- DD *Olecranon ulnæ, and the cavity which receives the os humeri.*

FIG. III.

THE radius.

- A *The smooth cavity which receives the end of the ulna.*
- B *A sharp ridge on the middle of the radius.*
- C *The tubercle of the radius.*
- D *The round head of the radius that articulates with the upper part of the ulna.*

FIG I

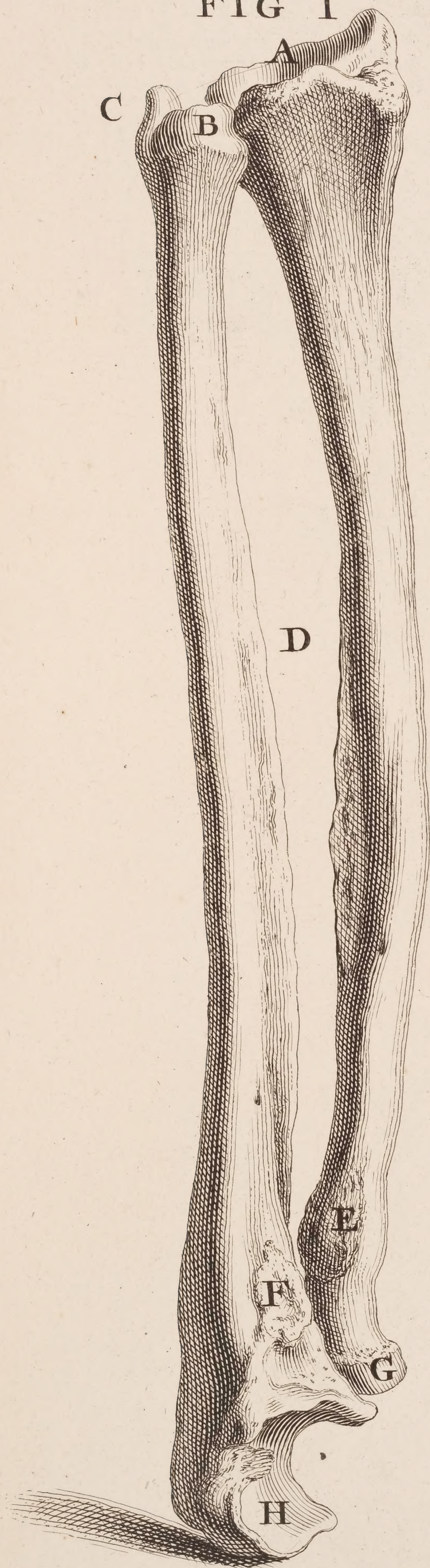


FIG II



FIG III



TABLE XXV.

FIG. I.

THE backside of the hand.

1, 2, 3, 5, 6, 7, 8. *Seven of the bones of the carpus.*

A A A *The three bones of the thumb.*

B B B B *The metacarpal bones of the fingers.*

C C C C *The first bones of the fingers.*

D D D D *The second bones.*

E E E E *The third bones.*

FIG. II.

THAT part of the carpal bones, which articulate with the thumb and fingers.

A *The bone upon which the thumb is placed.*

B *That upon which the metacarpal bone of the forefinger is placed.*

C *That upon which the metacarpal bone of the middle finger is placed.*

D E *That upon which the metacarpal bones of the two last fingers are placed.*

F G *Two processes, to which the carpal ligament is connected.*

H *The carpal bone, from which part of the same ligament arises.*

FIG. III.

THE inside of the hand.

1, 2, 3, 4, 5, 6, 7, 8. *The eight bones of the carpus.*

A A A *The three bones of the thumb.*

B B B B *The metacarpal bones of the fingers.*

C C C C *The first bones of the fingers.*

D D D D *The second bones.*

E E E E *The third bones.*

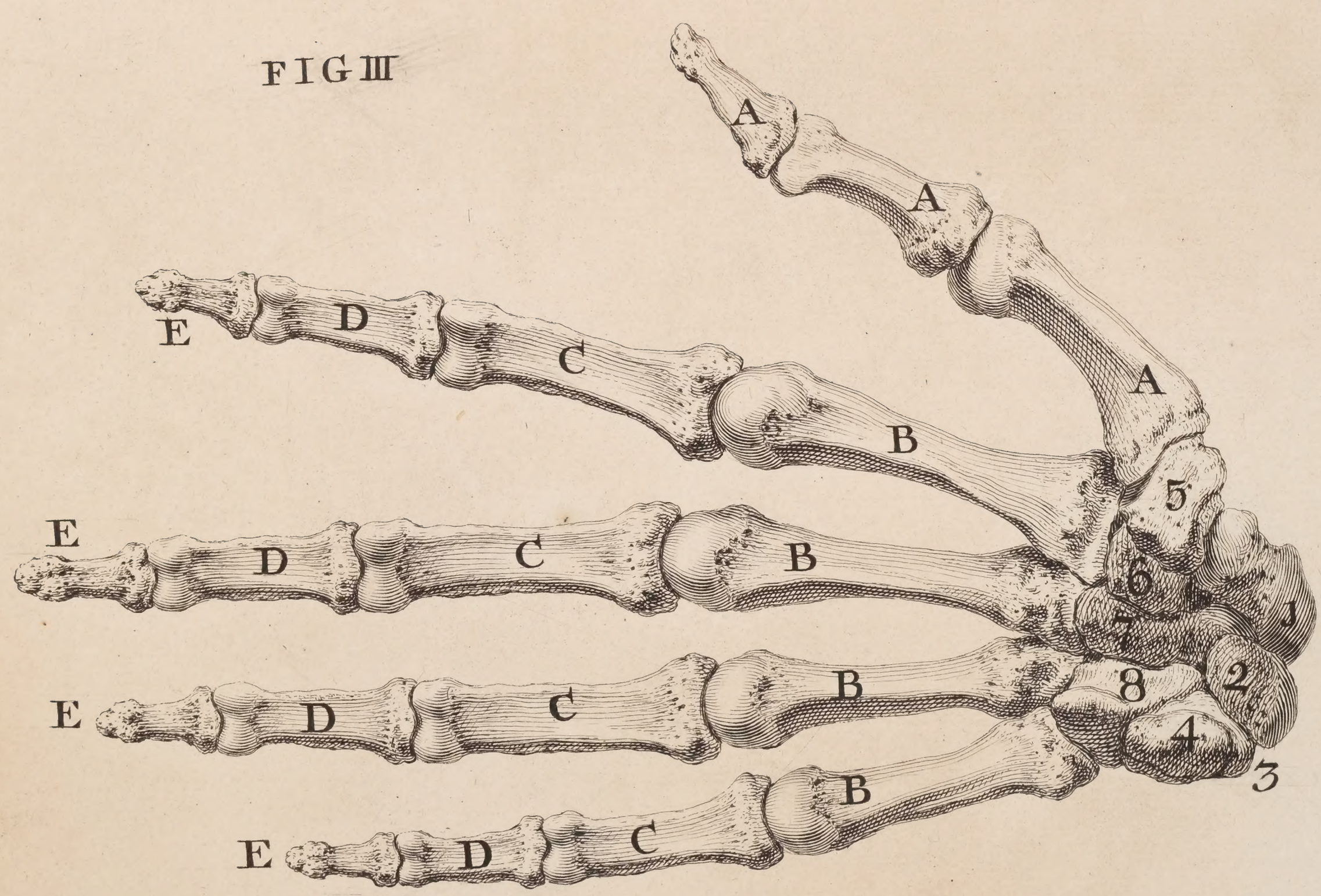
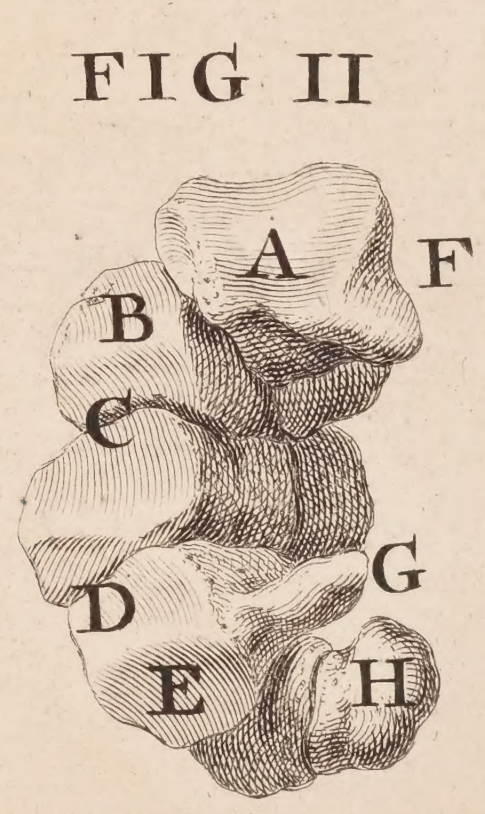
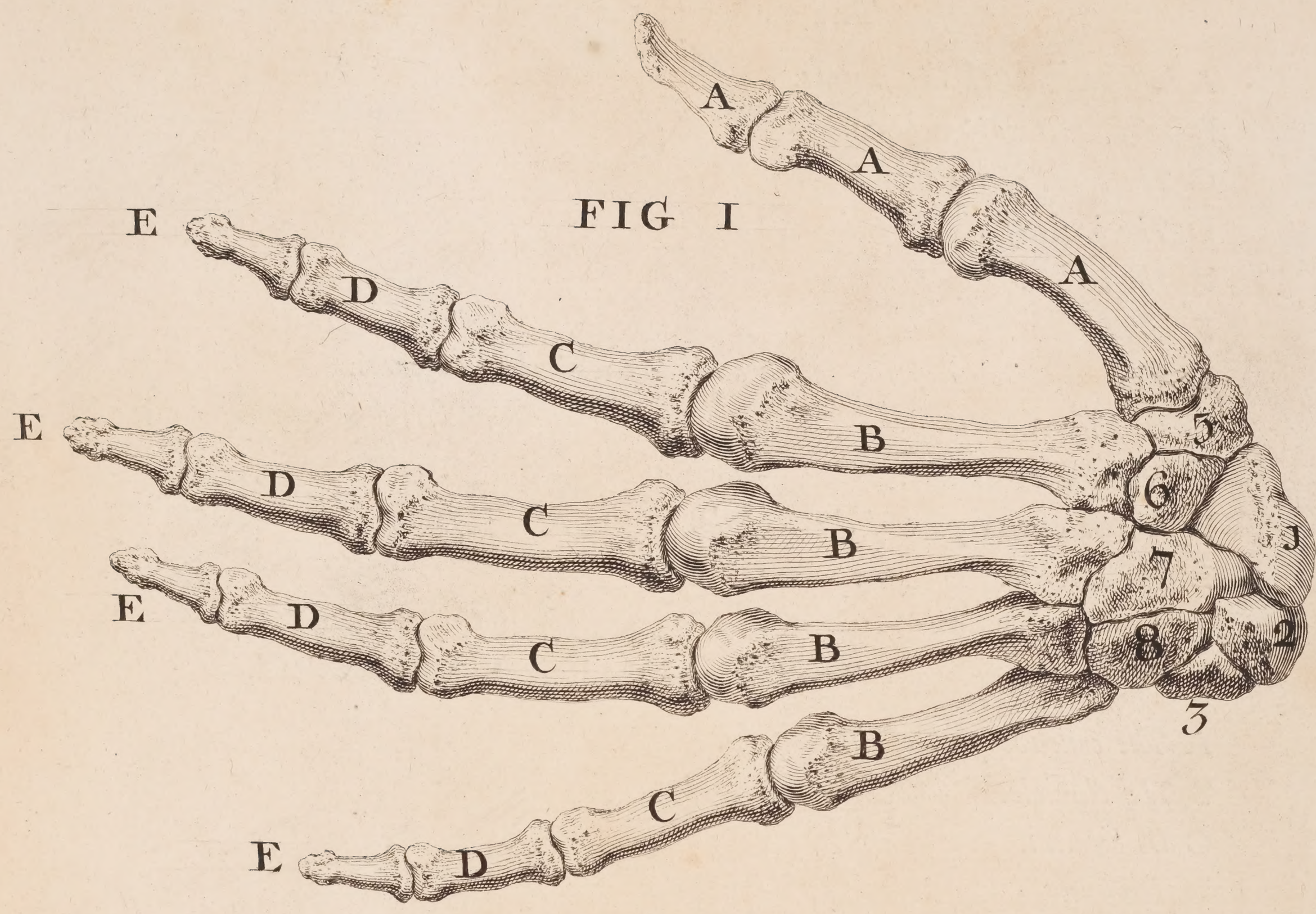


TABLE XXVI.

FIG. I.

THE outside of the scapula, arm and hand.

- AA *The bones of the fingers.*
- BB *The metacarpal bones.*
- C *The bones of the thumb.*
- D *The bones of the carpus.*
- E *The radius.*
- F *Ulna.*
- G *The articulation of the radius and ulna with the os humeri.*
- H *Os humeri.*
- I *Processus coracoides.*
- KK *The convex part of the scapula.*
- L *The clavicle.*

FIG. II.

THE inside of the scapula, arm and hand.

- A *The concave part of the scapula.*
- B *The clavicle.*
- C *Os humeri.*
- D *Radius.*
- E *Ulna.*
- F *Carpus.*
- G *Metacarpus.*
- H *The bones of the thumb.*
- II *The bones of the fingers.*
- K *The joint of the humerus.*
- L *The articulation of the elbow.*

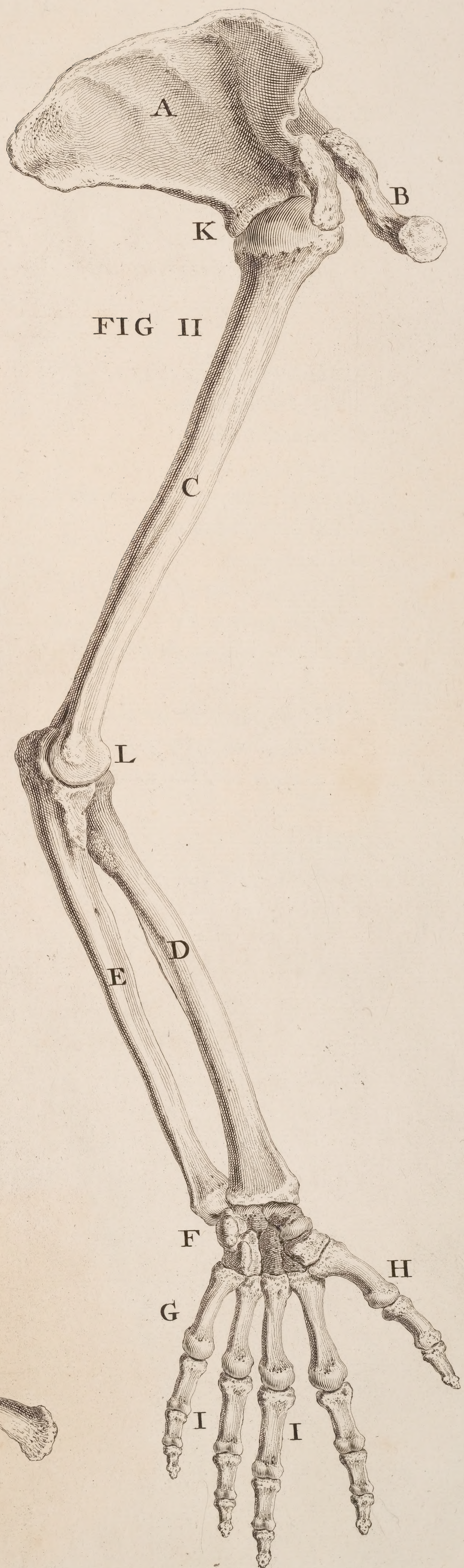
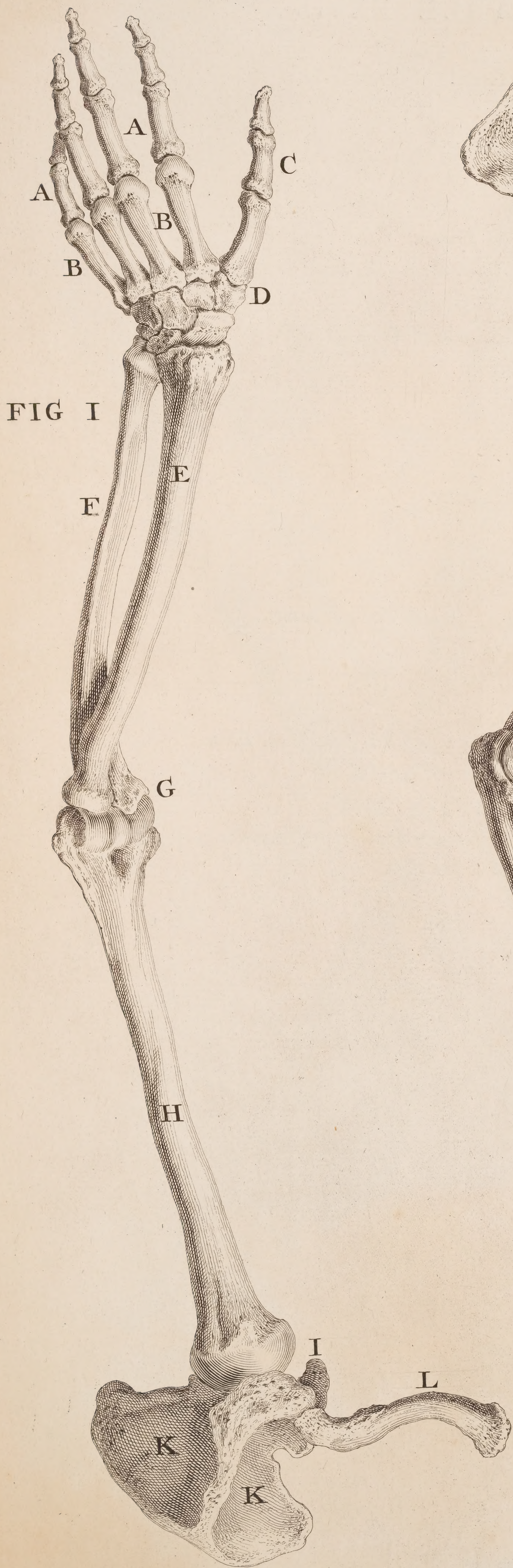


TABLE XXVII.

FIG. I.

THE forefide of the os femoris.

- A *The head of the os femoris.*
- B *The neck of the os femoris.*
- C *The great trochanter.*
- D *The little trochanter.*
- EF *The two lower apophyses of the os femoris.*
- G *That part of the os femoris, upon which the patella lies.*

FIG. II.

THE backfide of the os femoris.

- A *The head of the os femoris.*
- B *The great trochanter.*
- C *The neck of the os femoris.*
- D *The body of the os femoris.*
- E *remarkable roughnesses near the trochanter.*
- F *The little trochanter.*
- G *Linea aspera.*
- HI *The two lower apophyses of the os femoris.*
- KK *The parts of the os femoris, against which the tibia moves.*
- L *A cavity between the two apophyses.*

FIG. III.

- A *The forefide of the patella.*
- B *The lower extremity of the patella, by which it is fixed to the tibia.*
- C *The upper end, into which the muscles are inserted.*

FIG. IV.

- A *The under side of the patella, which moves upon the os femoris.*
- B *The lower part, by which it is tied to the tibia.*

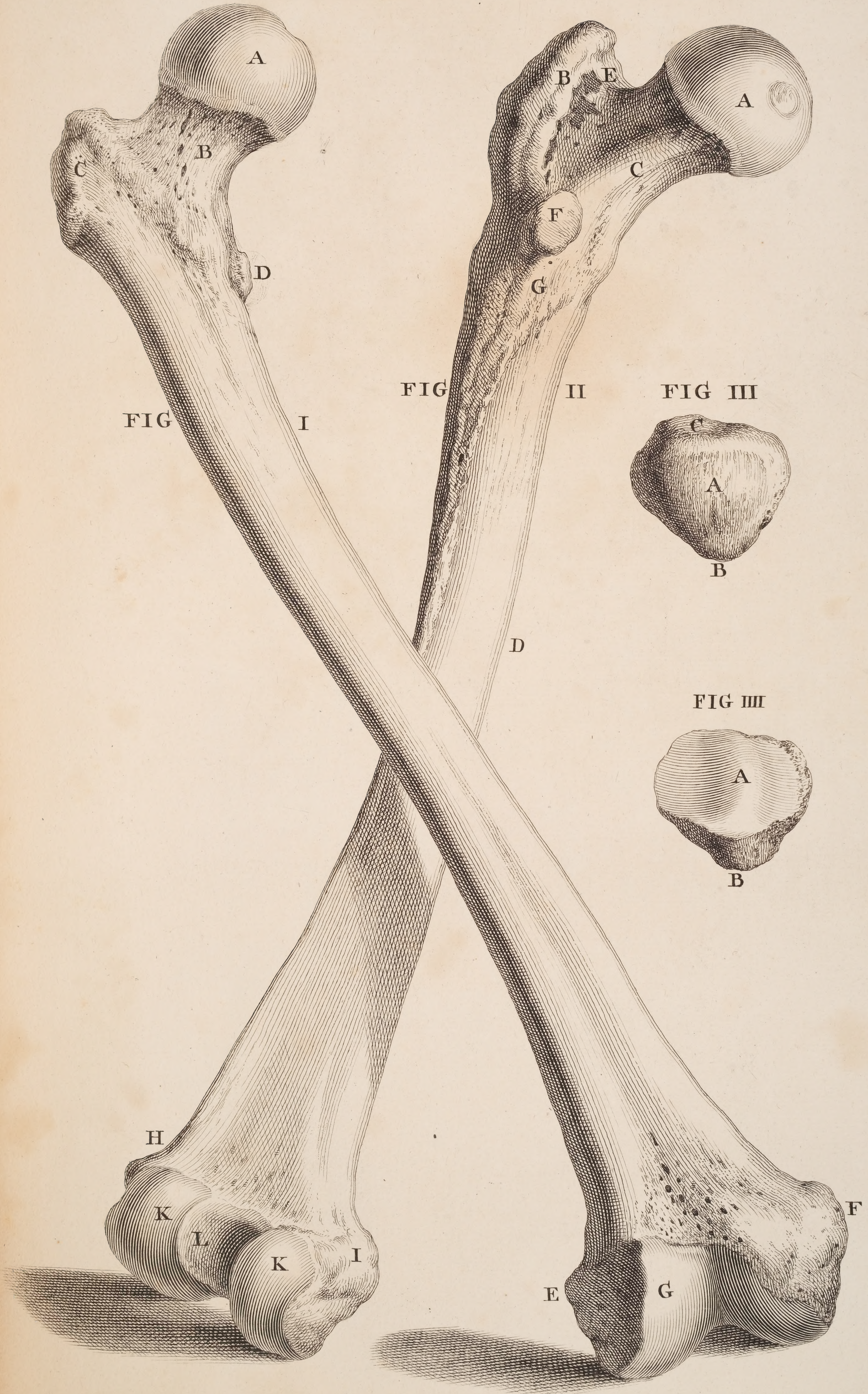


TABLE XXVIII.

FIG. I.

THE forefide of the tibia and fibula.

- A *A process from which the cross ligaments arise.*
- B *The process to which the ligament of the patella is fix'd.*
- C *A remarkable impression of the muscles.*
- D *The process which makes the inner ankle.*
- E *That end of the tibia which articulates with the foot.*
- F *The head of the fibula.*
- G *The end of the fibula that makes the outer angle.*

FIG. II.

THE backside of the tibia.

- A *That part of the tibia, with which the head of the fibula is articulated.*
- BB *The sockets in which the apophyses of the os femoris are received.*
- C *The process from which the cross ligaments arise.*
- D *The perforation through which the vessels pass to the internal substance of the bone.*
- E *The spine of the tibia from which the transverse ligament arises.*
- F *The outside of the tibia with which the lower end of the fibula is articulated.*
- G *The process of the tibia which makes the inner ankle.*
- HI *The end of the tibia which receives the astragalus.*

FIG. III.

THE inside of the fibula.

- A *A process at the upper end of the fibula into which a ligament is fixed.*
- B *A sharp edge of the fibula.*
- C *The lower end of the fibula which makes the outer ankle.*

XXVIII

FIG I



C FIG II

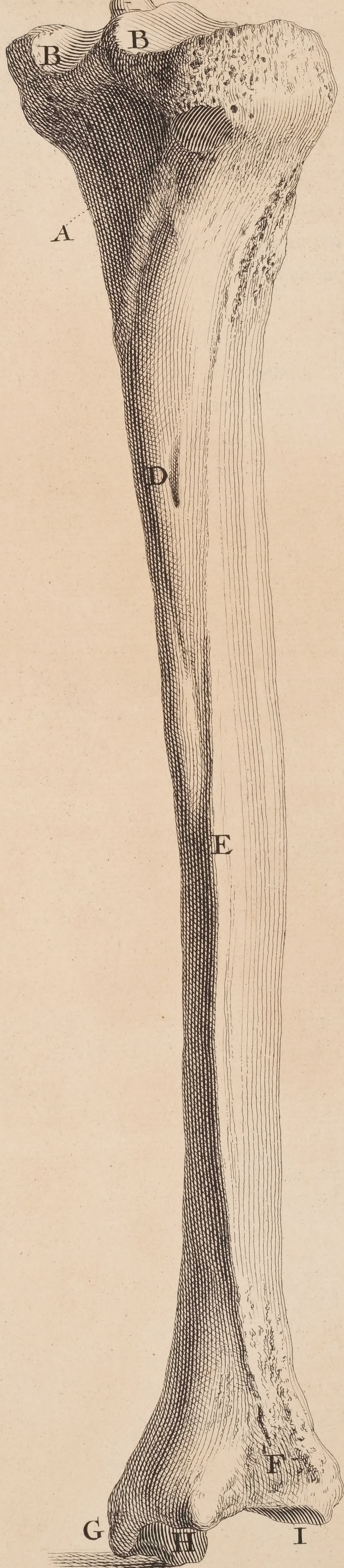


FIG III

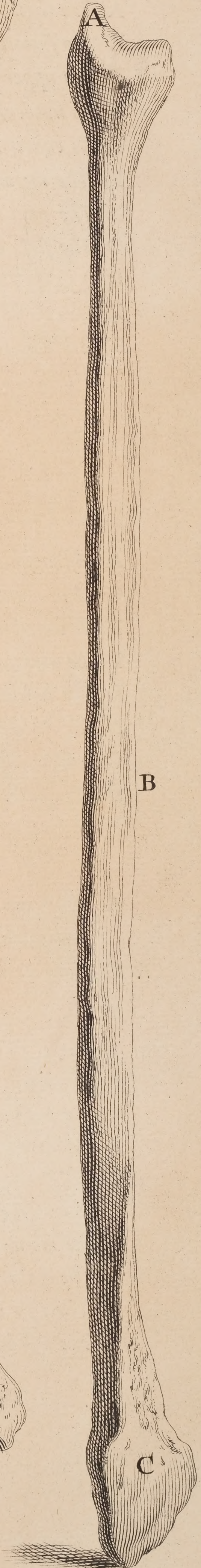


TABLE XXIX.

FIG. I.

THE under side of the bones of the foot.

- A *Os calcis.* BCD *Three protuberances of the os calcis.*
 E *The smooth part of the astragalus which joins the os naviculare.*
 F *The upper side of the astragalus which articulates with the tibia.*
 G *Os naviculare.* H *Os cuboides.* I *A sulcus in the os cuboides.*
 K *Os cuneiforme majus.* L *Os cuneiforme maximum.*
 M *The metatarsal bone of the great toe.*
 N *The part upon which the sesamoid bones are moved.*
 O *The first bone of the great toe.* P *The last bone of the great toe.*
 QQQQ *The metatarsal bones of the four lesser toes.*
 RRRR *The first bones of the four lesser toes.*
 SSSS *The second bones of the four lesser toes.*
 TTTT *The last bones of the four lesser toes.*

FIG. II.

THE sesamoid bones of the great toe.

FIG. III.

THE upper side of the bones of the foot.

- A *Astragalus, that part which articulates with the tibia.* B *Os calcis.*
 C *A prominence of the os calcis.* D *Os naviculare.* E *Os cuboides.*
 F *Os cuneiforme majus.* G *Os cuneiforme minimum.* H *Os cuneiforme maximum.*
 I *The metatarsal bone of the great toe.* K *The first bone of the great toe.*
 L *The last bone of the great toe.* MMMM *The metatarsal bones of the four lesser toes.*
 NNNN *The first bones of the four lesser toes.*
 OOOO *The second bones of the four lesser toes.*
 PPPP *The last bones of the four lesser toes.*

FIG. IIII.

THE side (next to the great toe) of the bones of the second toe.

- A *That part of the metatarsal bone of the second toe which articulates with the os cuneiforme maximum.* B *The end which joins the toe.*
 C *The first bone of the toe.* D *The second.* E *The third.*

FIG. V.

THE inside of the bones of the foot.

- A *Astragalus.* B *That part of the astragalus which articulates with that apophysis of the tibia which makes the inner ankle.* C *Os calcis.* D *A protuberance of the os calcis.*
 E *Os naviculare.* F *Os cuneiforme maximum.*
 G *A smooth surface over which part of the tendon of the tibialis anticus passes to be inserted into the metatarsal bone of the great toe.* H *Os cuneiforme minimum.*
 I *The metatarsal bone of the great toe.* K *The metatarsal bone of the second toe.*
 L *The metatarsal bones of the three last toes.* M *The sesamoid bone of the great toe.*
 N *The first bone of the great toe.* O *The last bone of the great toe.*
 P *The last bones of the two next toes.*

FIG I
T

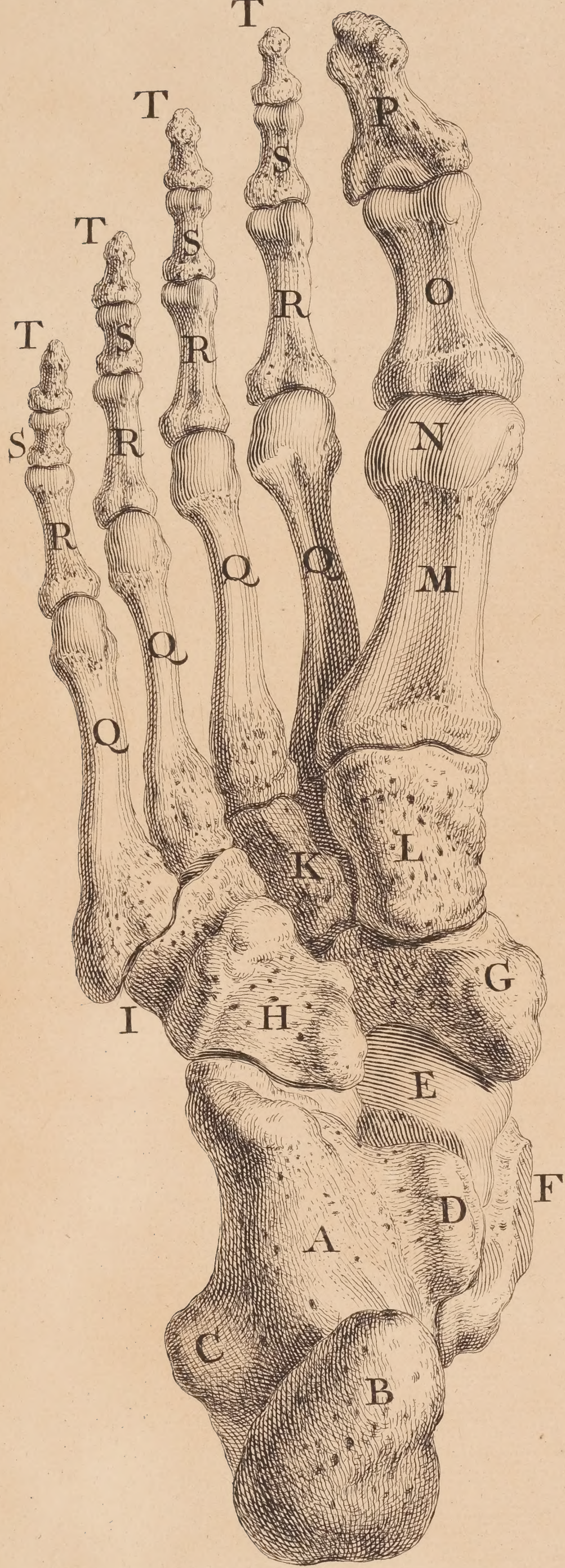


FIG II

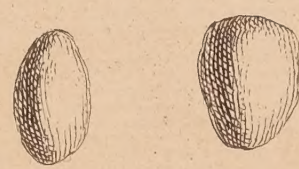


FIG III

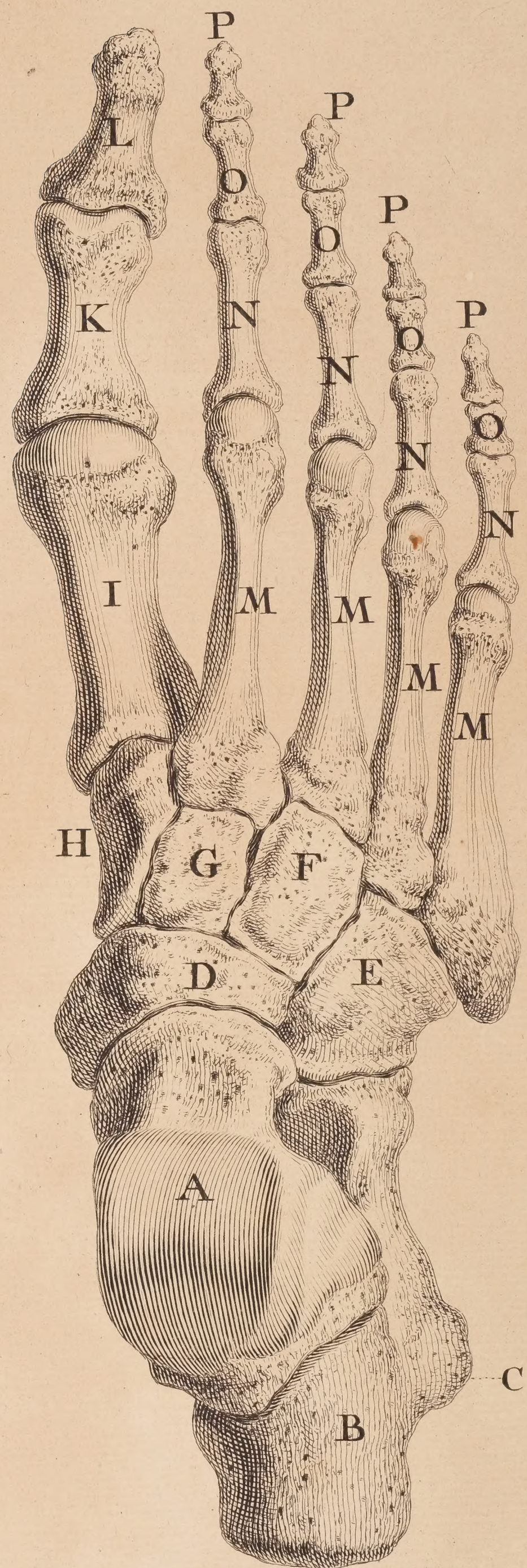


FIG IIII

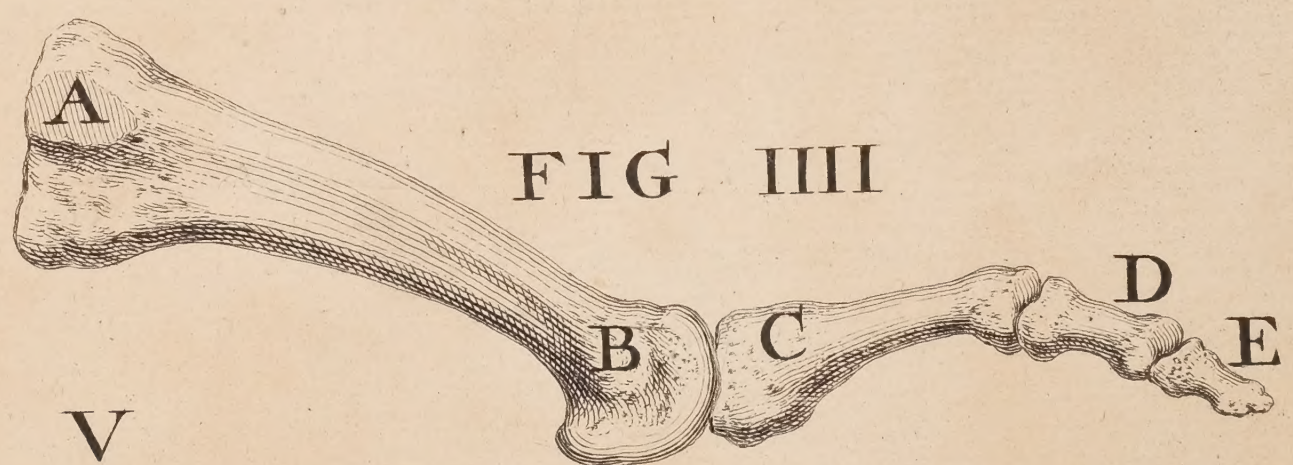


FIG V

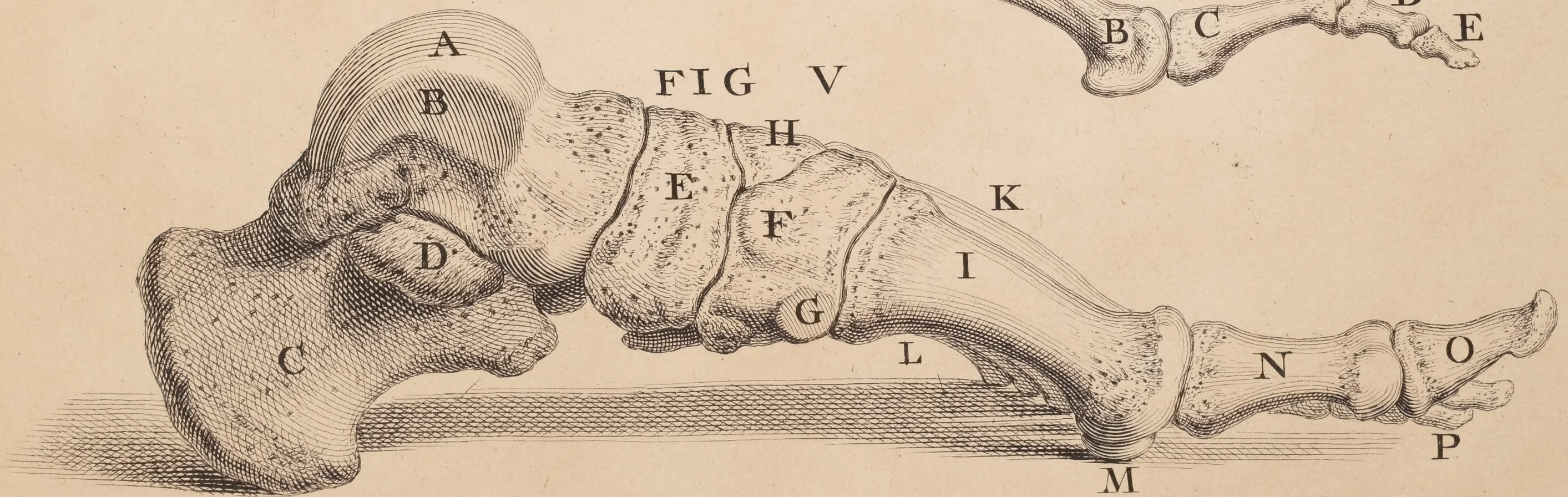


TABLE XXX.

FIG. I.

THE outside of the bones of the lower limb.

- A *The Head of the os femoris.*
- B *Trochanter major.* C *Trochanter minor.*
- D *The external apophysis of the os femoris.*
- E *Patella.*
- F *The head of the tibia.*
- G *The protuberance into which the ligament of the patella is inserted.*
- H *The concave side of the tibia.*
- I *The lower end of the tibia.*
- K *The upper end of the fibula.*
- L *The lower end of the fibula.*
- M *Astragalus.*
- N *Os calcis.*
- O *Os cuboides.*
- P *Os naviculare.*
- Q *Os cuneiforme majus.*
- R *Os cuneiforme minimum.*
- S *Os cuneiforme maximum.*
- T *The metatarsal bone of the great toe.*
- U *The two bones of the great toe.*
- W *The metatarsal bones of the four lesser toes.*
- X *The first bones of the four lesser toes.*
- Y *The second bones of the four lesser toes.*
- Z *The last bones of the four lesser toes.*

FIG. II.

THE inside of the bones of the lower limb.

- A *The head of the os femoris.*
- B *Trochanter major.* C *Trochanter minor.*
- DD *Linea aspera.*
- E *The inner apophysis of the os femoris.*
- F *The outer apophysis.*
- G *Patella.*
- H *The upper end of the tibia.*
- I *The lower end of the tibia.*
- K *The upper end of the fibula.*
- L *The lower end of the fibula.*
- M *Astragalus.*
- N *Os calcis.*
- O *Os naviculare.*
- P *Os cuneiforme maximum.*
- Q *The metatarsal bone of the great toe.*
- R *The first bone of the great toe.*
- S *The last bone of the great toe.*
- T *Os sesamoides.*
- U *Ossa metatarsi.*

FIG I

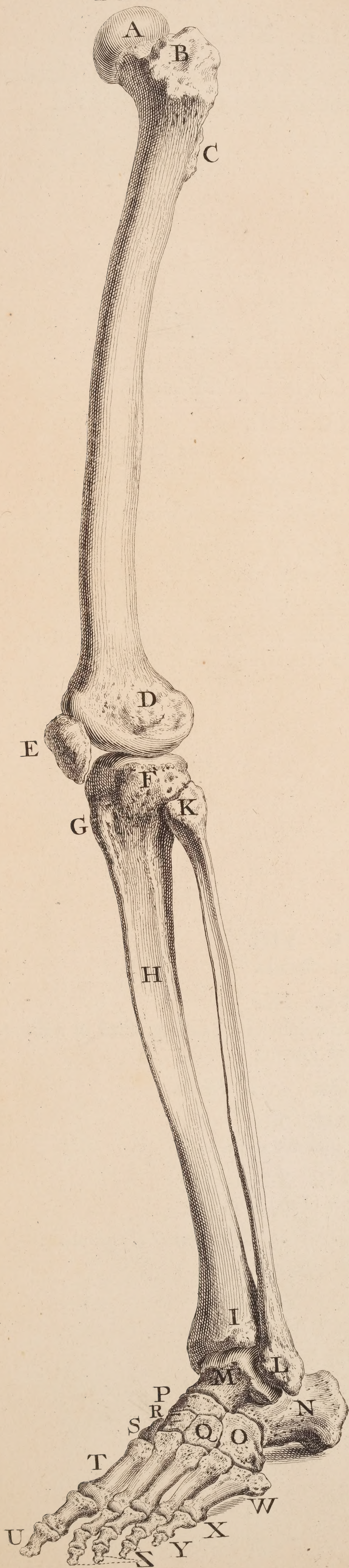


FIG II

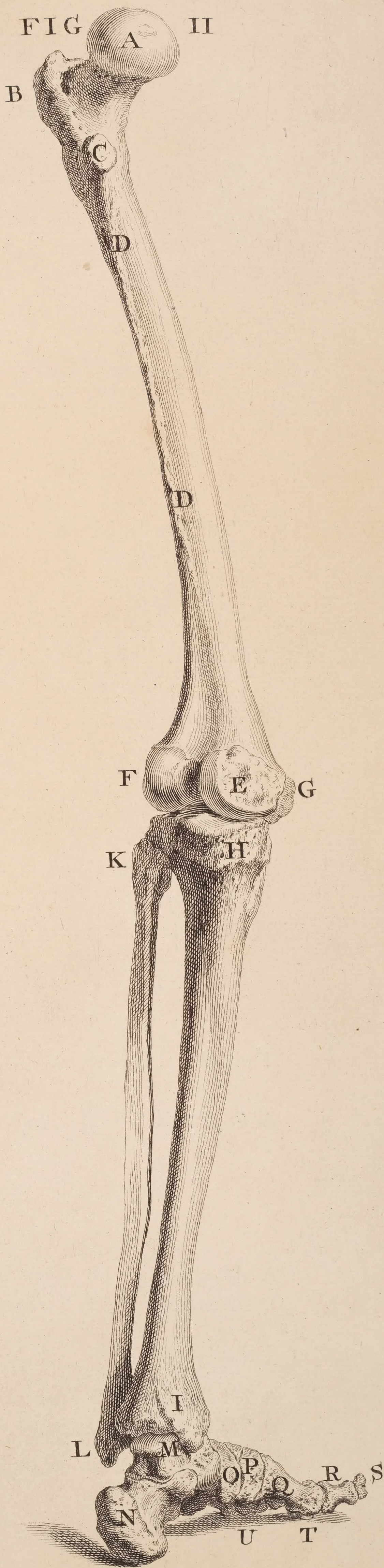


TABLE XXXI.

THE bones of a full grown foetus, in which their particular shapes, divisions and textures are to be observ'd.

FIG. I.

THE scull, in which the directions of the fibres of the several bones are to be observ'd.

- A *The upper part not yet ossified.*
- B *Os frontis.*
- C *Os bregmatis.*

FIG. II.

THE upper part of the os occipitis.

FIG. III.

THE lower part of the os occipitis separated.

FIG. IIII.

THE bones which compose one vertebra separated.

FIG. V.

THE circular bone of the os temporis on which the membrana tympani is extended.

FIG. VI.

THE lower jaw.

FIG. VII.

THE upper limb, in which the cartilaginous epiphyses are distinguished by a different manner of graving.

- A *Scapula.*
- B *Os humeri.*
- C *Radius.*
- D *Ulna.*
- E *Carpus.*
- F *The bones of the thumb.*
- G *Metacarpus.*
- H *The bones of the fingers.*

FIG. VIII.

THE clavicle.

FIG. IX.

THE lower limb, in which the cartilaginous epiphyses are distinguished by a different manner of graving.

- A *Os femoris.*
- B *Patella.*
- C *Tibia.*
- D *Fibula.*

FIG. X.

THE os innominatum.

FIG. XI.

THE bones of the foot.

- A *Astragalus.*
- B *The rest of the tarsus.*
- C *The bones of the great toe.*
- D *Metatarsus.*
- E *The bones of the four lesser toes.*

FIG. XII.

THE trunk of a full grown foetus.

- A *The Spine.*
- B *Sternum.*
- C *The Ribs.*
- D *The vertebrae of the loins.*
- EE *Ossa innominata.*
- F *Os sacrum.*

FIG I

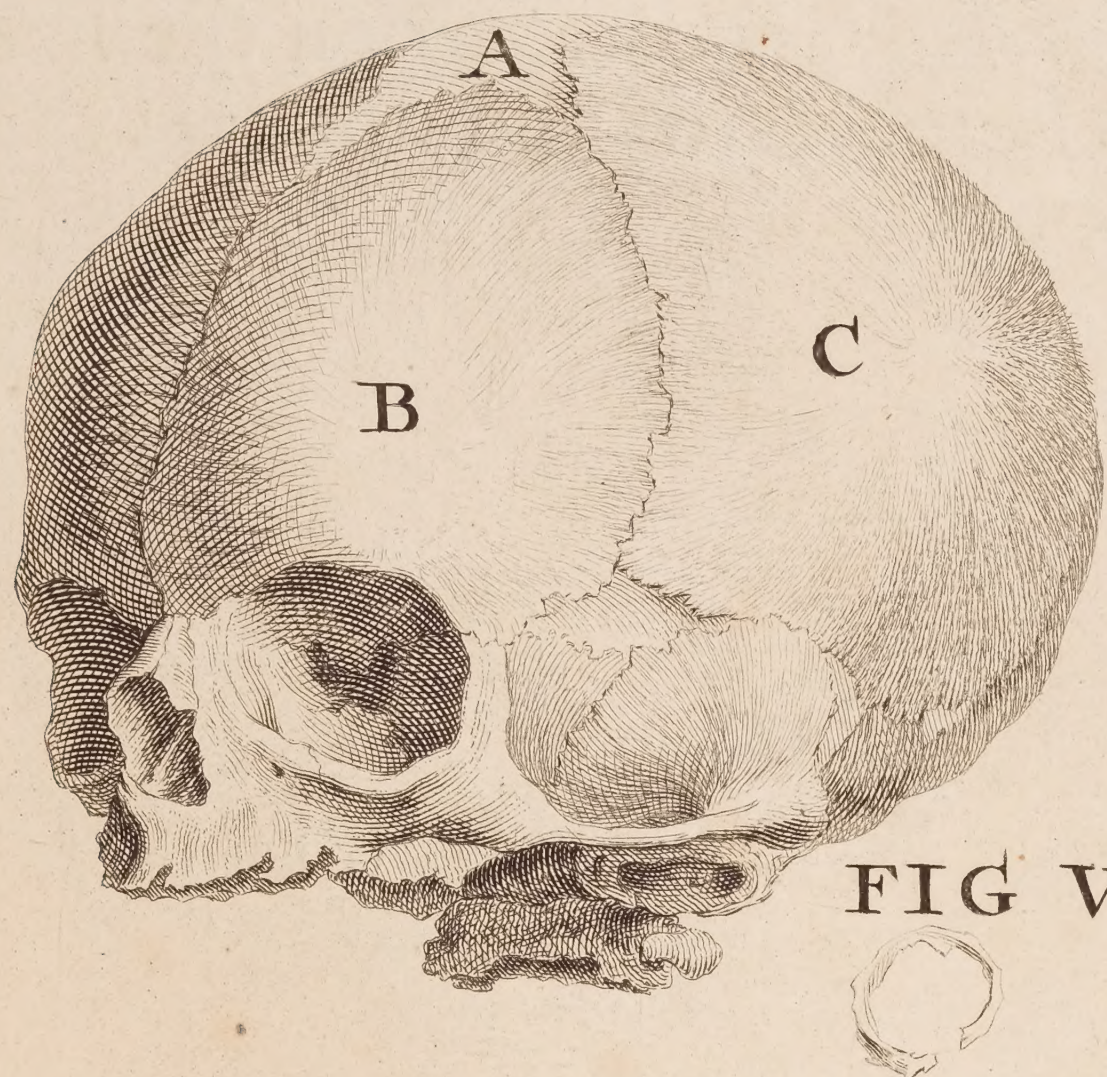


FIG II



FIG III



FIG IIII



FIG V



FIG VII

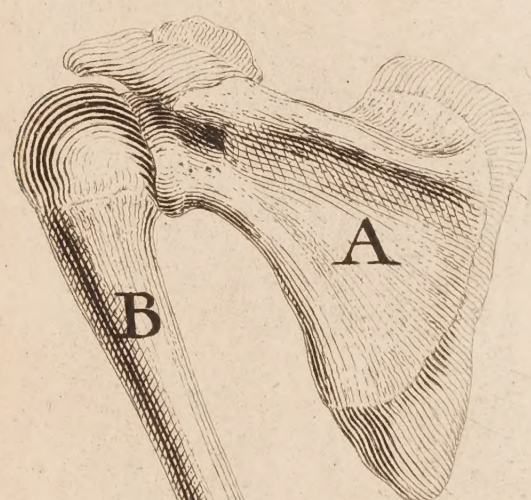


FIG VI

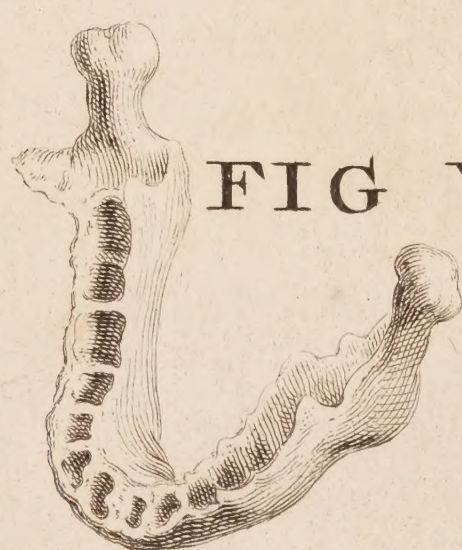


FIG IX



FIG X



FIG VIII

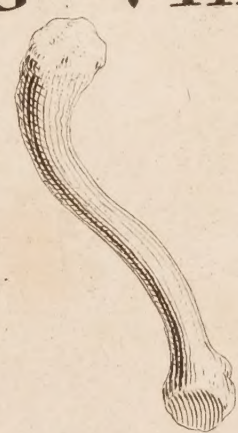


FIG XI



FIG XII



TABLE XXXII.

THE skeleton of a child a year and a half old, with the os humeri of a man in the left hand, to shew by comparifon the fize of the child; here alfo are to be obferved the different fapes and textures of the feveral bones.

- A *Os frontis.*
- B *The bones of the face.*
- C *Clavicula.*
- D *Sternum.*
- EE *Os humeri.*
- FF *The bones of the cubit.*
- GG *The bones of the hand.*
- H *The os humeri of an adult.*
- I *The ribs.*
- K *The spine.*
- LL *Os innominatum.*
- M *Os facrum.*
- N *Os coccygis.*
- OO *Os femoris.*
- P *Patella.*
- Q *Tibia.*
- R *The right leg forefhortened.*
- SS *The bones of the feet.*

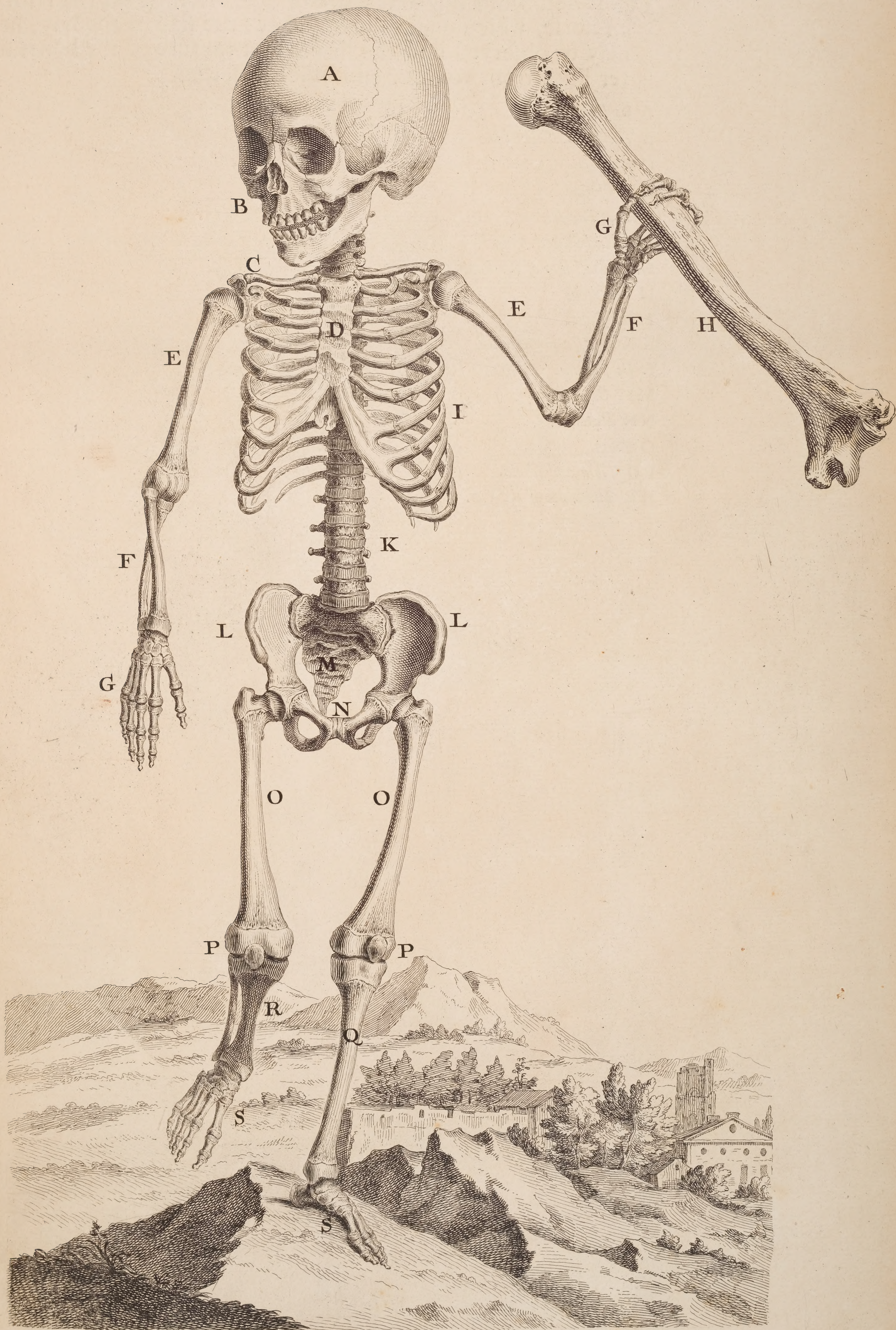


TABLE XXXIII.

THE skeleton of a boy nine years of age, leaning on the scull of an horse, which comparatively shews the size of the boy; here may be observed how the shapes and texture of the bones differ both from younger and older skeletons.

- A *Os frontis.*
- B *The bones of the face.*
- C *The jaws in which the teeth are newly changed.*
- DD *Clavicula.*
- EE *Os humeri.*
- FF *Radius and ulna.*
- GG *The bones of the hand.*
- H *Sternum.*
- I *The spine.*
- KKK *Ossa innominata.*
- L *Os sacrum.*
- MM *Os femoris.*
- NN *Patella.*
- O *Tibia.*
- PQ *Tibia and fibula.*
- RR *The bones of the feet.*



TABLE XXXIV.

THE sceleton of a woman, in the same proportions with the
venus of Medicis.

A *Os frontis.*

B *The bones of the face.*

C *The lower jaw.*

D *The vertebræ of the neck.*

EE *Clavicula.*

F *Sternum.*

GG *Os humeri.*

HH *Radius & ulna.*

I *The bones of the hand.*

K *The vertebræ of the loins.*

LLL *Ossa innominata.*

M *Os sacrum.*

NN *Os femoris.*

O *Tibia.*

P *Tibia.*

Q *Fibula.*

RR *The bones of the feet.*

XXXIV

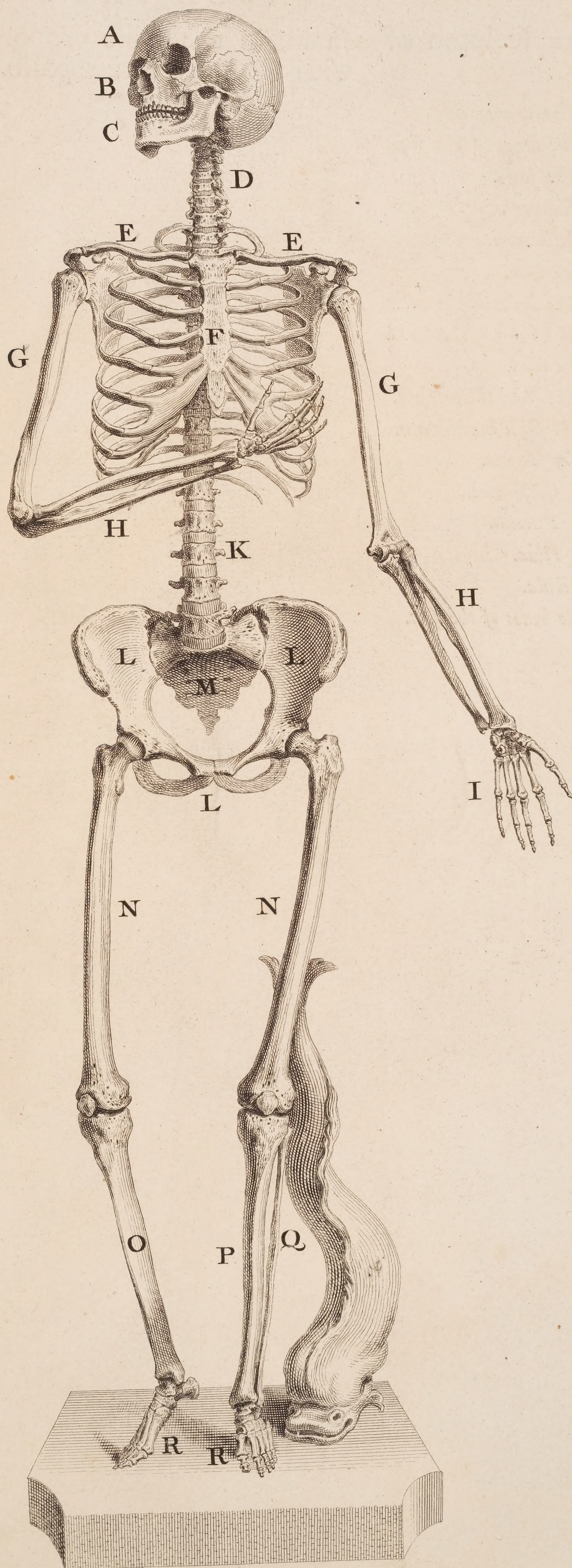


TABLE XXXV.

THE skeleton of a man, in the same proportions and attitude
with the Belvidere Apollo.

- A *The cranium.*
- B *The bones of the face.*
- C *The jaws.*
- D *Clavicula.*
- E *Os humeri.*
- F *Sternum.*
- G *The bones of the cubit.*
- H *The bones of the hand.*
- I *The ribs.*
- K *The lumbar vertebræ.*
- LLL *Ossa innominata.*
- M *Os sacrum.*
- NN *Os femoris.*
- OO *Patella.*
- PQ *Tibia.*
- R *Fibula.*
- S *The bones of the foot.*

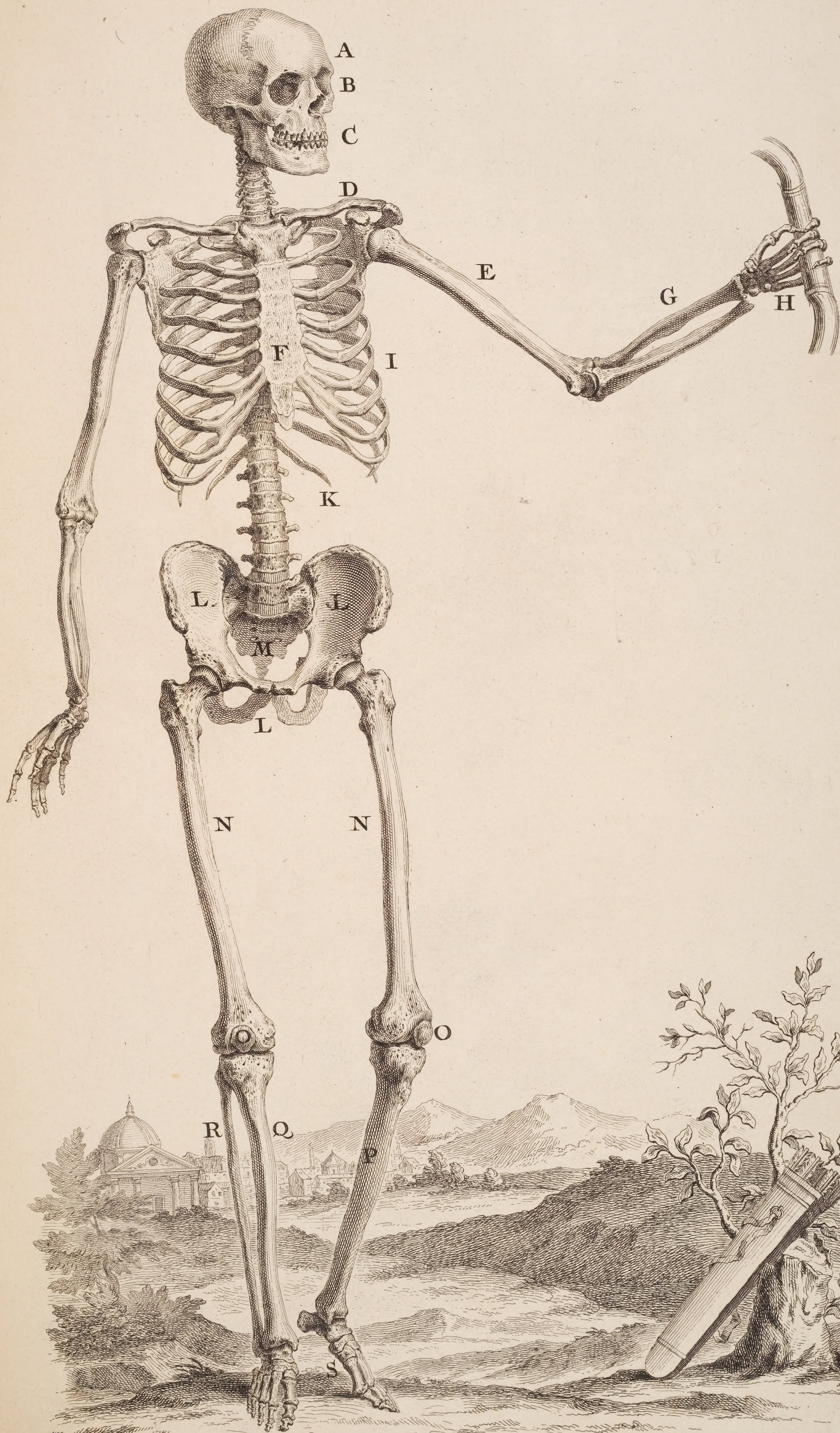


TABLE XXXVI.

THE side view of the skeleton of a very robust man, put into this attitude to represent the figure in a larger scale.

- A *The bones of the cranium.*
- B *The bones of the face.*
- C *The jaws.*
- D *The spinal processes of the vertebræ of the neck.*
- E *Scapula.*
- FF *Os humeri.*
- GG *Radius & ulna.*
- H *The bones of the hand.*
- I *The ribs.*
- K *The cartilages of the sternum.*
- L *The spinal processes of the vertebræ of the loins.*
- MM *Os innominatum.*
- N *Os sacrum.*
- O *Os femoris.*
- P *Patella.*
- Q *Tibia and fibula.*
- R *The bones of the feet.*

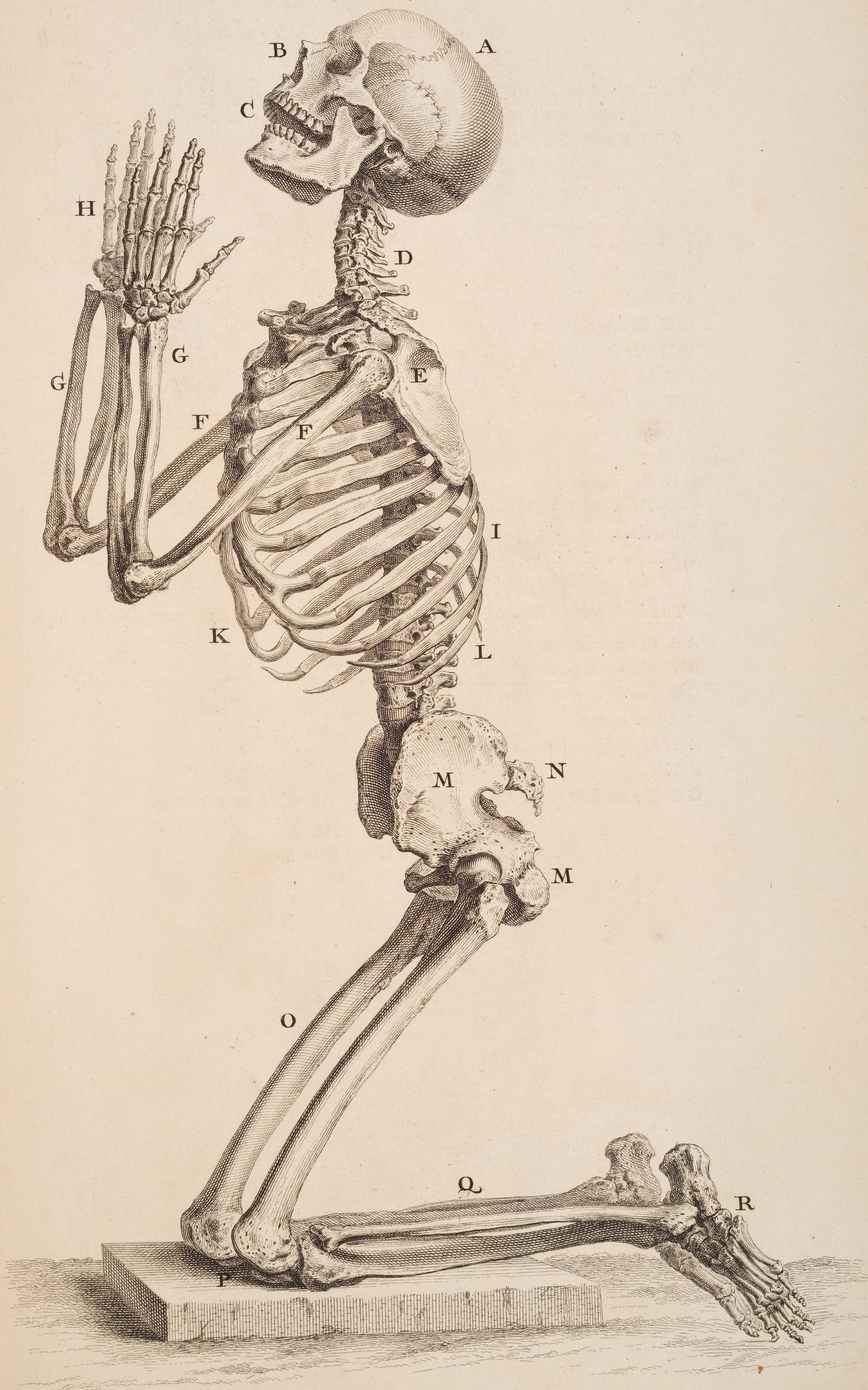


TABLE XXXVII.

FIG. I.

THE back part of the sceleton of a man five feet and a half high, the left hand resting on the hip of another sceleton, which was near eight feet high.

- A *Os bregmatis.*
- B *The bones of the face.*
- C *Os maxille inferioris.*
- D *The spine.*
- EE *Scapula.*
- FF *Os humeri.*
- GG *Radius and ulna.*
- HH *The bones of the hands.*
- I *Costæ.*
- KK *Os innominatum.*
- L *The obtuse process of the ischium.*
- M *Os sacrum.*
- NN *Os femoris.*
- OO *Tibia.*
- PP *Fibula.*
- Q *The bones of the feet.*

FIG. II.

THE back part of some of the bones of the lower limb of a man, near eight feet high.

- AA *Os innominatum.*
- B *Trochanter major.*
- CC *Two lesser trochanters.*
- D *Linea aspera.*
- E *The apophyses of the os femoris.*
- F *Tibia.*
- GG *The out lines of the fibula, and bones of the feet which were wanting.*

FIG. III.

THE scull of the same man.

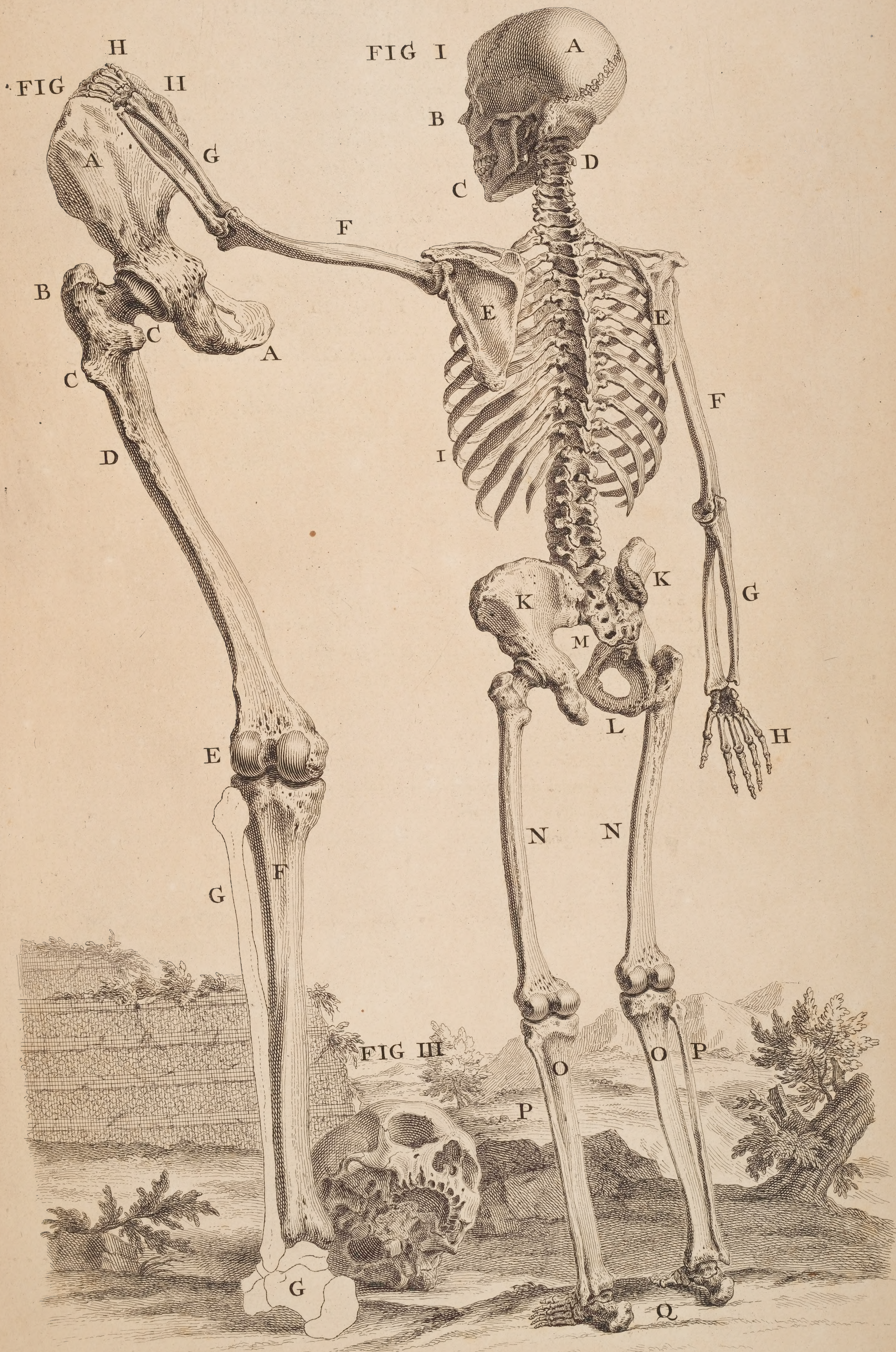


TABLE XXXVIII.

FIG. I.

PART of the scull and the upper vertebræ of the neck cut transverse.

- AA *The inner parts of the mamillary processes.*
- BB *The parts of the occipital bone which articulate to the first vertebra.*
- C *The part of the first vertebra that articulates with the os occipitis.*
- D *The dental process of the second vertebra discerned through the ligament that holds it in its place.*
- EF *Other ligaments which strengthen the articulation with the first vertebra.*

FIG. II.

- A *The loose cartilage of the condyloide process of the lower jaw.*

FIG. III.

THE bones of the carpus next the radius cover'd with their proper ligaments.

- AAA *The cartilaginous surfaces that articulate with the other bones of the carpus for an obscure motion.*
- B *The cavity through which the tendons of the flexors pass to the fingers.*

FIG. IIII.

THE remaining bones of the carpus which are articulated to the metacarpal bones cover'd with their proper ligaments.

- AB *The cartilaginous surfaces of these bones which articulate with the other bones of the carpus.*

FIG. V.

- A *The scapula.*
- BBB *The bursal ligament of the acetabulum scapulæ.*
- C *A ligament which joins the processus acromion and the coracoides.*
- D *A ligament which fastens the clavicle to the processus coracoides.*

FIG. VI.

- A *The bones of the thumb united with its proper ligaments.*
- B *The ligament of the fore finger which ties down the tendons.*
- C *A ligament which connects the ends of the metacarpal bones.*
- D *The ligament which ties down the tendons, cut open.*
- EE *Bursal ligaments of the fingers.*
- F *The transverse ligament of the carpus that binds down all the tendons which bend the fingers.*

XXXVIII

FIG I

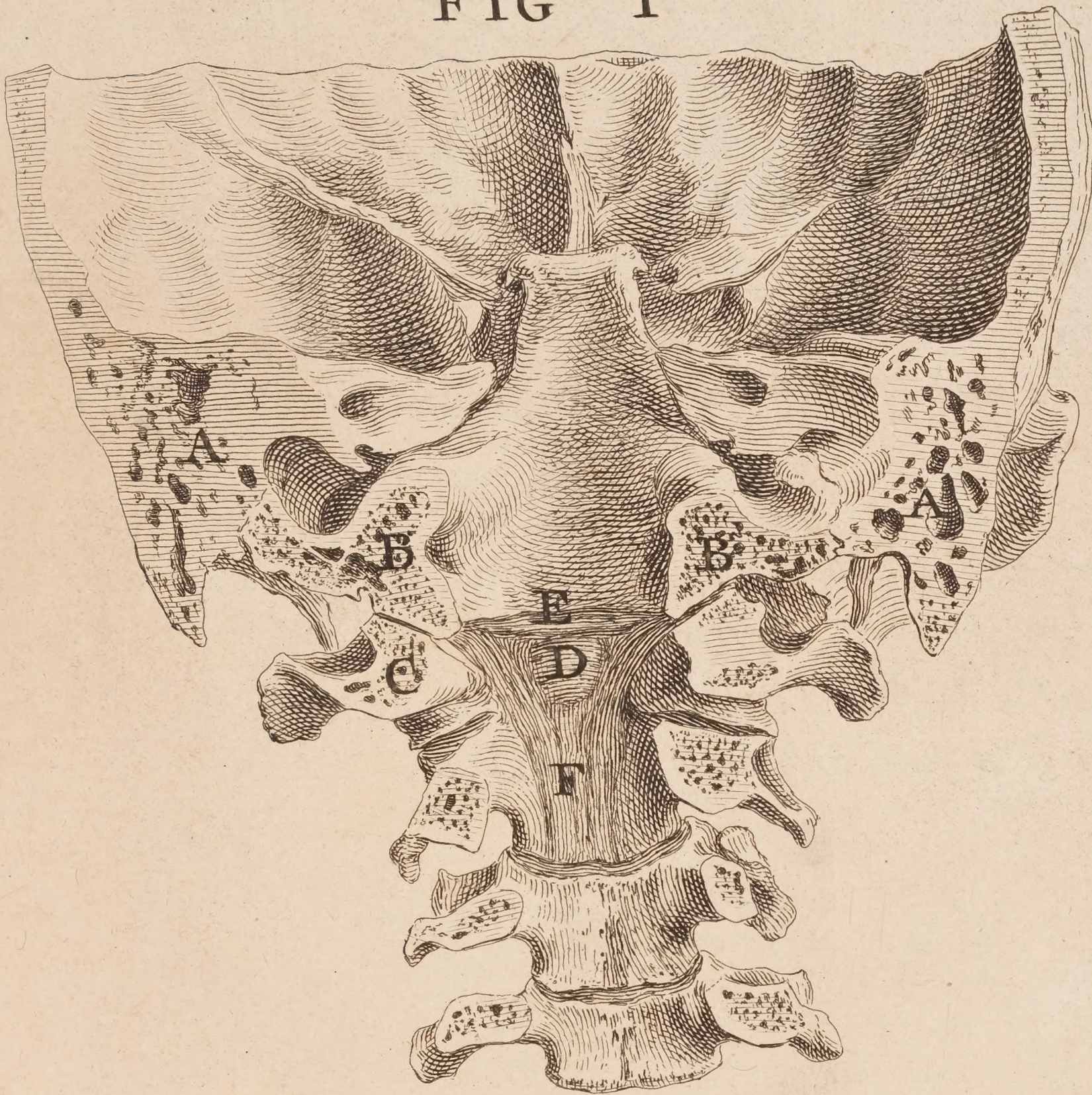


FIG II

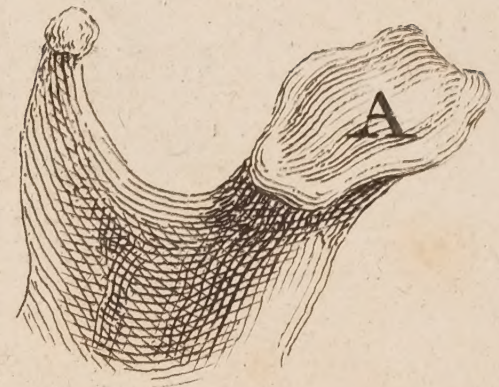


FIG III

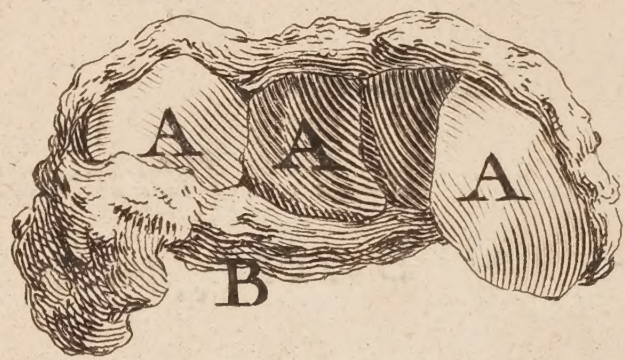


FIG IIII



FIG V

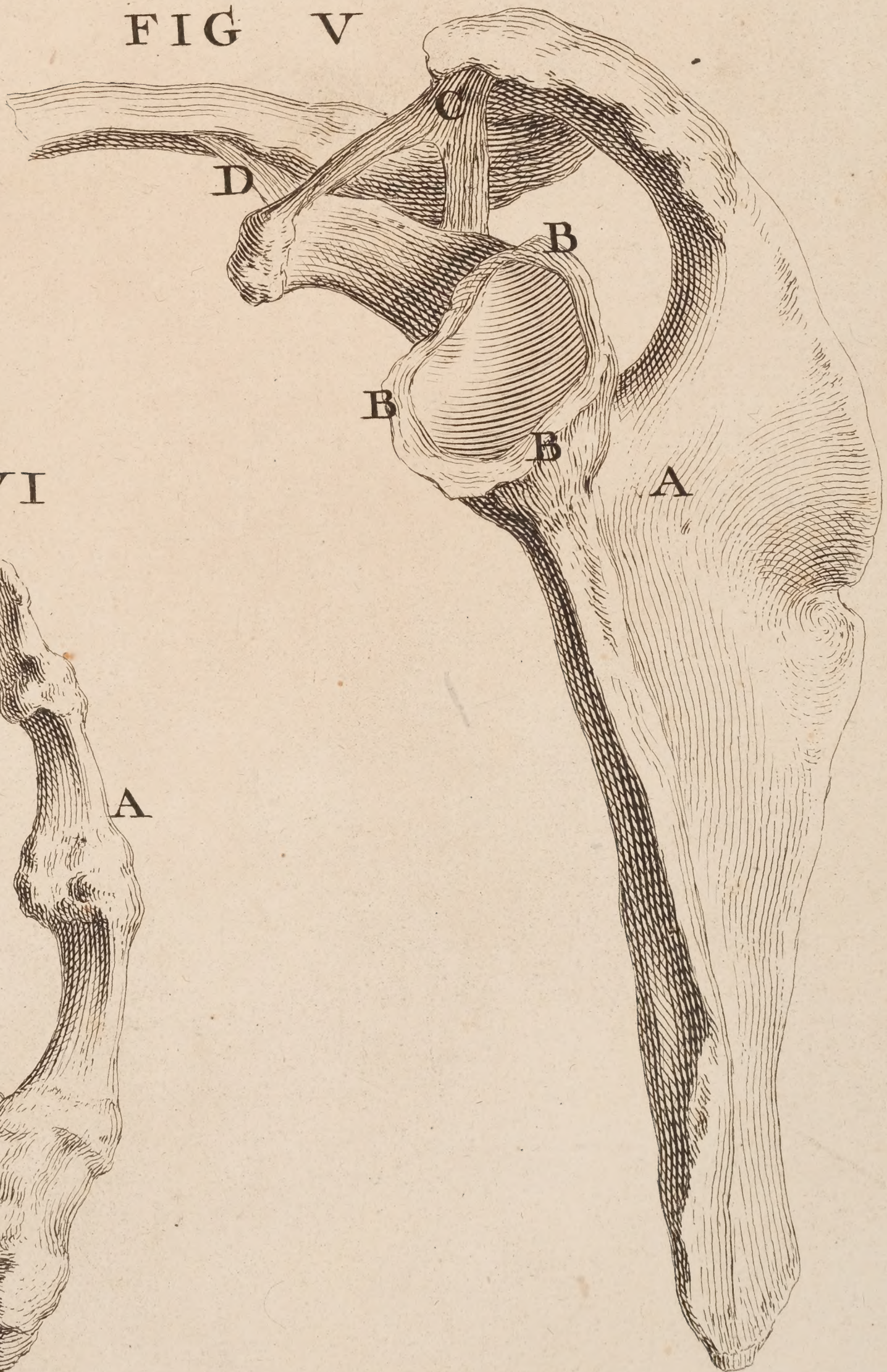


FIG VI



TABLE XXXIX.

FIG. I.

- A *The cartilaginous ligament that joyns the os sacrum to the last vertebra.*
- B *A very strong ligament which joyns the os sacrum to the os ilium.*
- C *A strong ligament which joyns the os sacrum and coccygis to the obtuse process of the ischium.*
- D *A ligament which joyns the same bones to the acute process of the ischium.*
- E *The bursal ligament that joyns the os femoris to the os innominatum.*

FIG. II.

- A *The part of the acetabulum of the os innominatum (cover'd with a cartilage) on which the os femoris is moved.*
- B *The head of the os femoris.*
- C *The ligamentum teres which hinders the os femoris from being luxated upwards.*

FIG. III.

- A *The lubricating gland in the sinus of the socket of the os innominatum.*
- B *The ligament in the great foramen of the os innominatum.*

FIG I

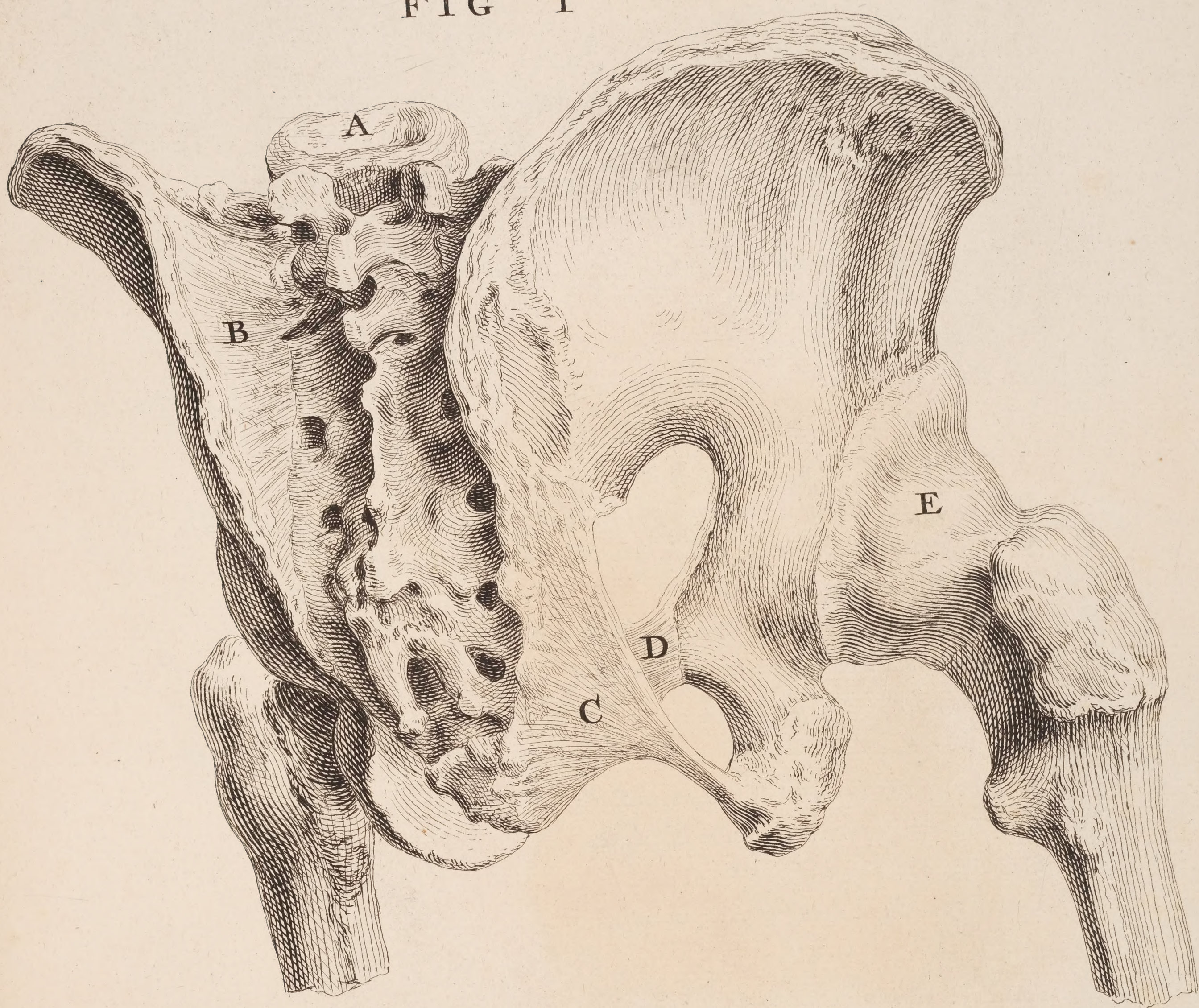


FIG II

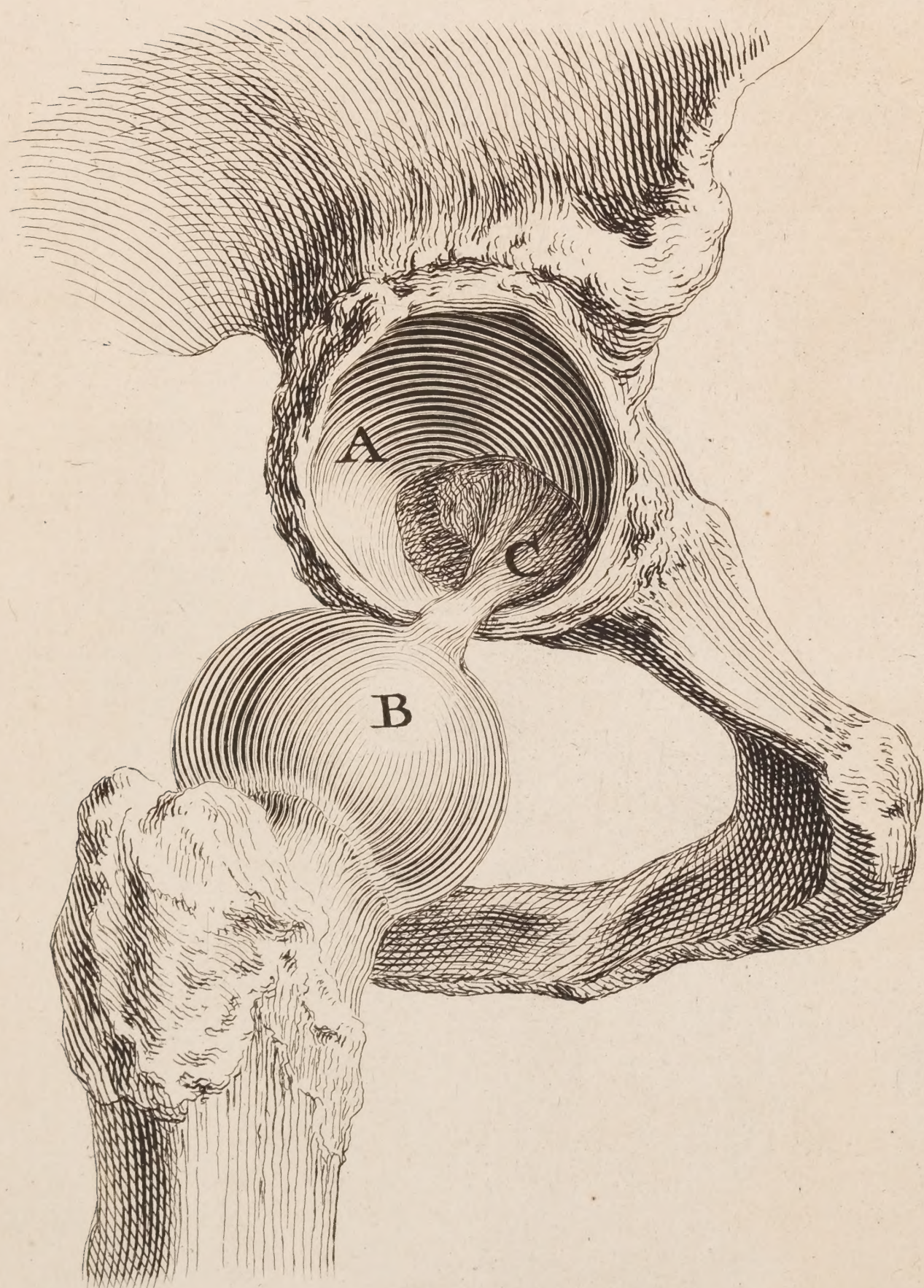


FIG III

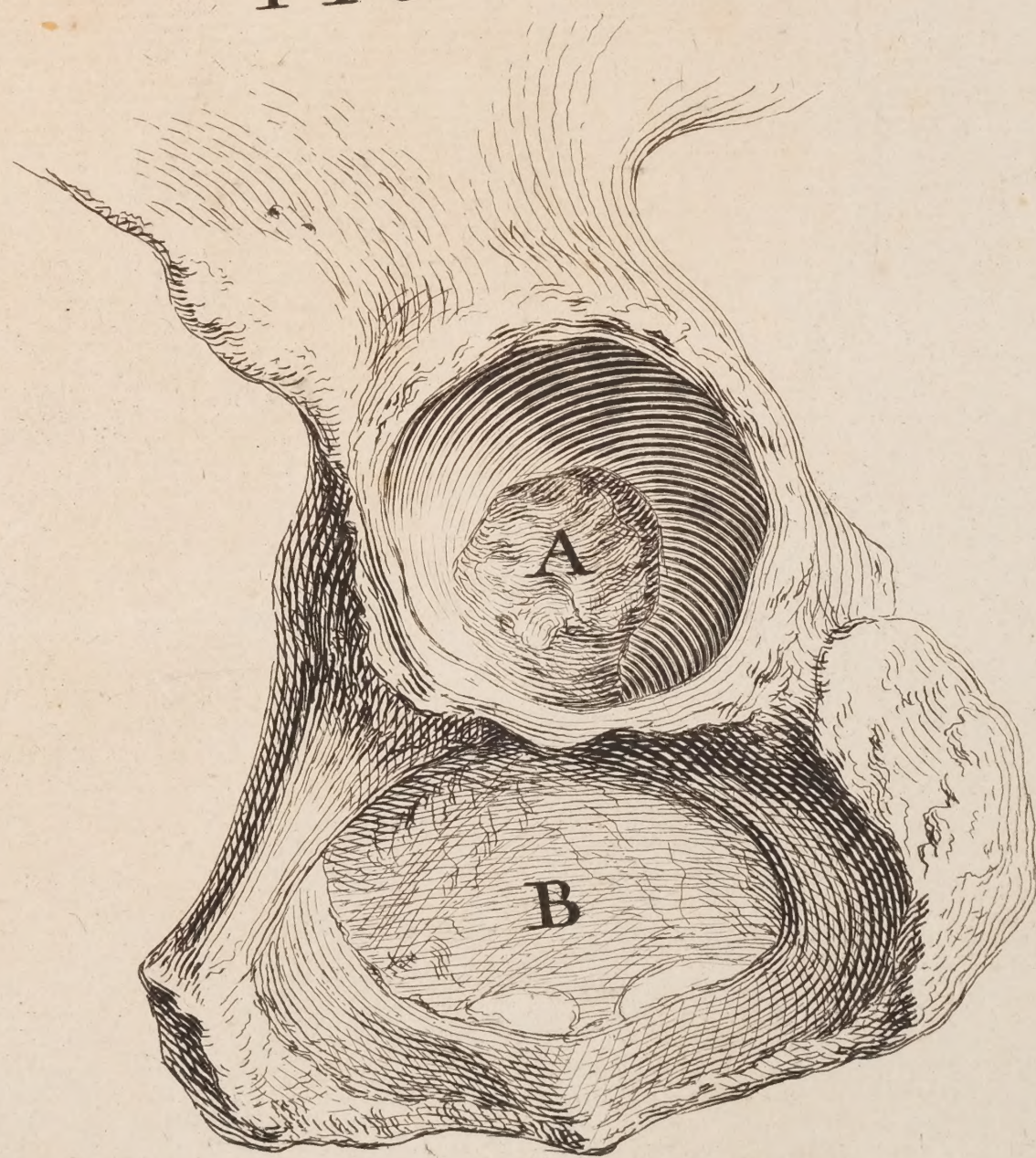


TABLE XL.

FIG. I.

- A A *The apophyses at the lower end of the os femoris cover'd with cartilage.*
- B *The upper end of the tibia.*
- C *Ligament of this joynt which also moves the semilunar cartilage.*
- D E *The strong cross ligaments.*
- F *Ligament of this joynt which is fixed to the upper end of the fibula.*

FIG. II.

- A *The outer and lower apophysis of the os femoris.*
- B *Part of the bursal ligament.*
- C *The patella.*
- D *The ligament or tendon of the patella by which the extensors act upon the tibia.*

FIG. III.

- A *That part of the os femoris on which the patella moves.*
- B B *Those parts of the apophyses of the os femoris which move upon the tibia.*
- C *Ligament of this joynt which moves the semilunar cartilages.*
- D D *The strong cross ligaments.*
- E *The fat in which the lubricating glands are contained.*
- F *The ligament or tendon of the patella.*
- G *The under side of the patella.*

FIG. IIII.

- A *Part of the ligament of the patella.*
- B B *The semilunar cartilages of the knee.*
- C C *The upper end of the tibia.*
- D D *Part of the strong cross ligaments.*

FIG. V.

- A A A A *Strong ligaments on the under side of the tarsus.*
- B *The tendon of the peroneus longus.*

FIG I

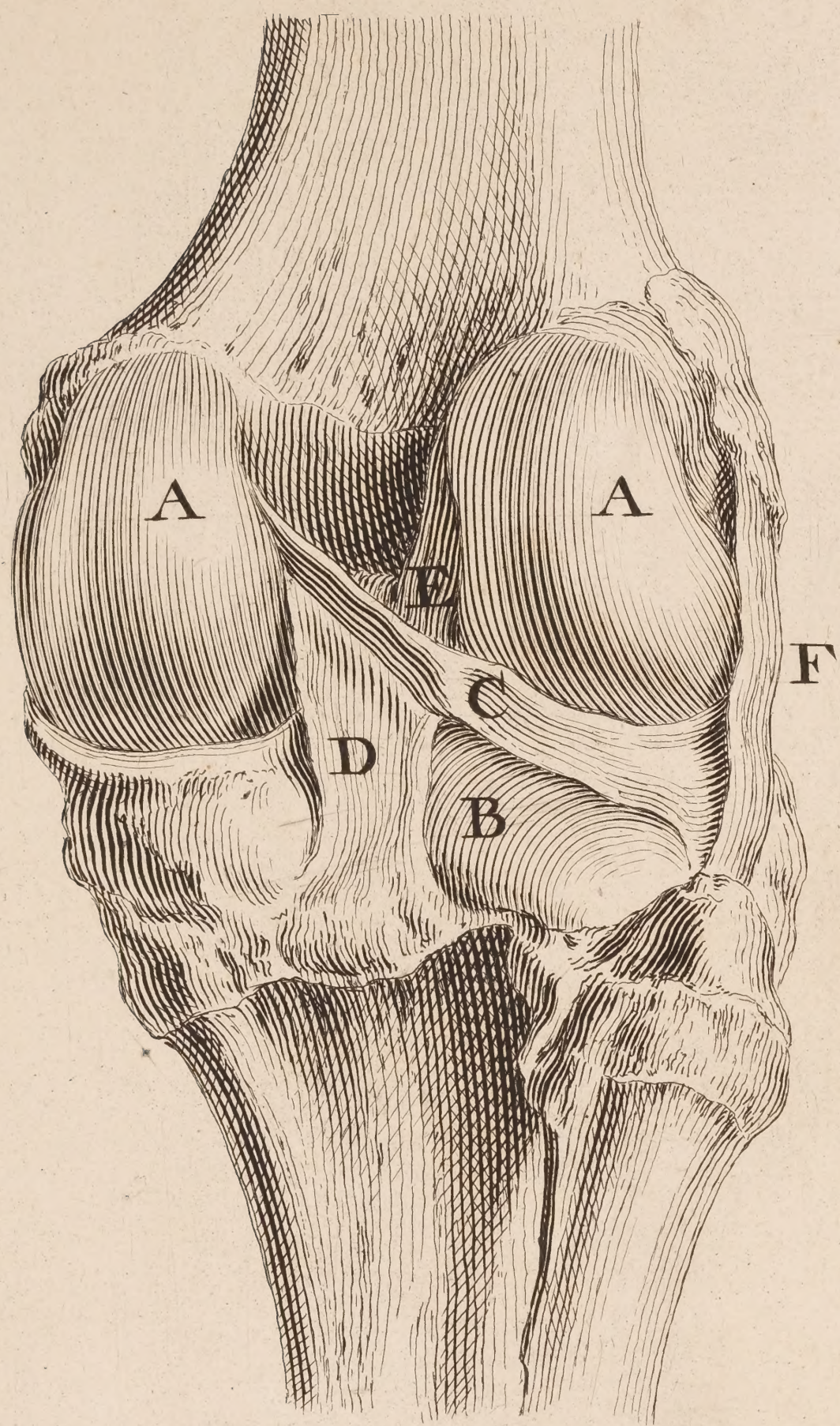


FIG II

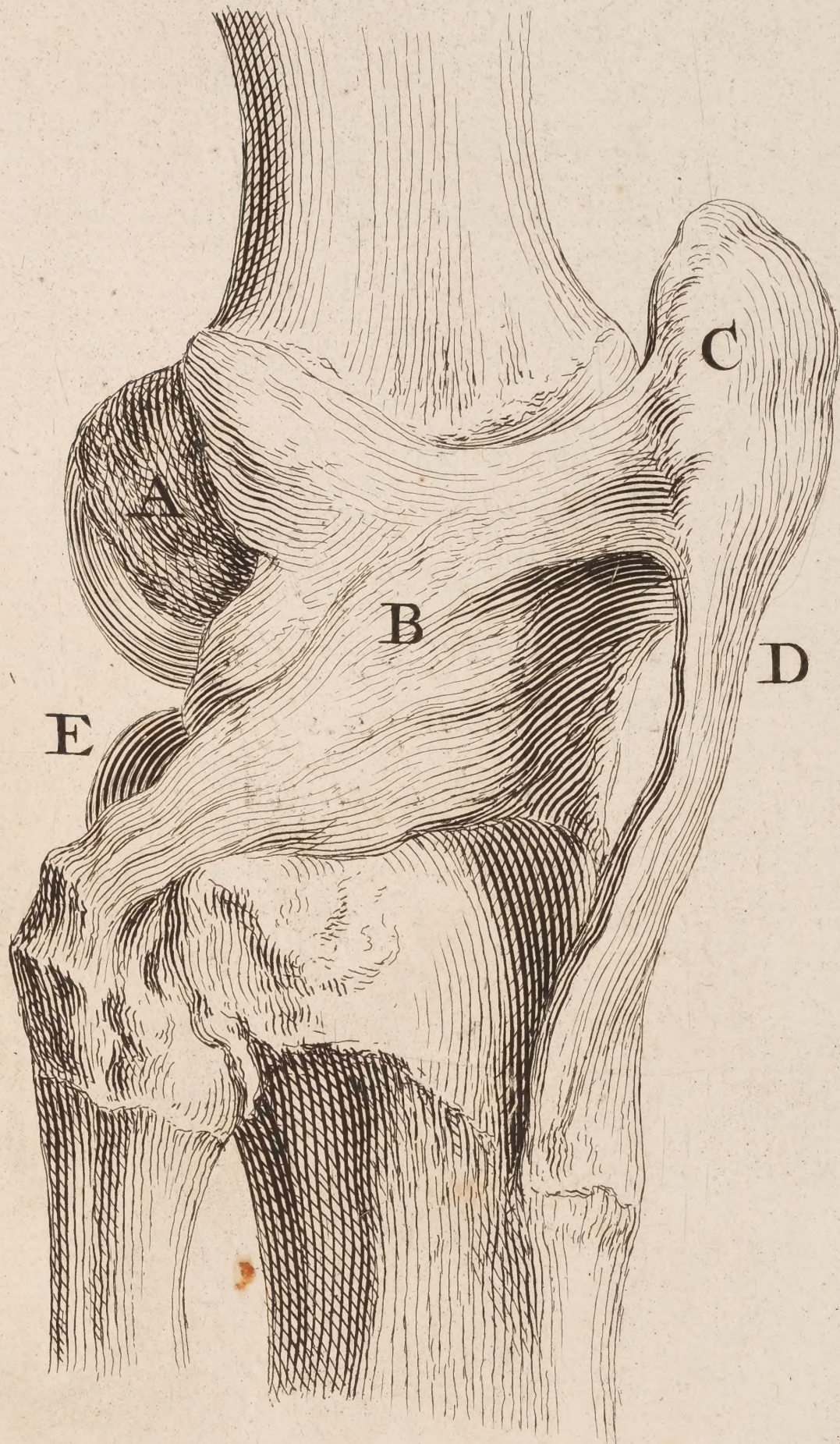


FIG III

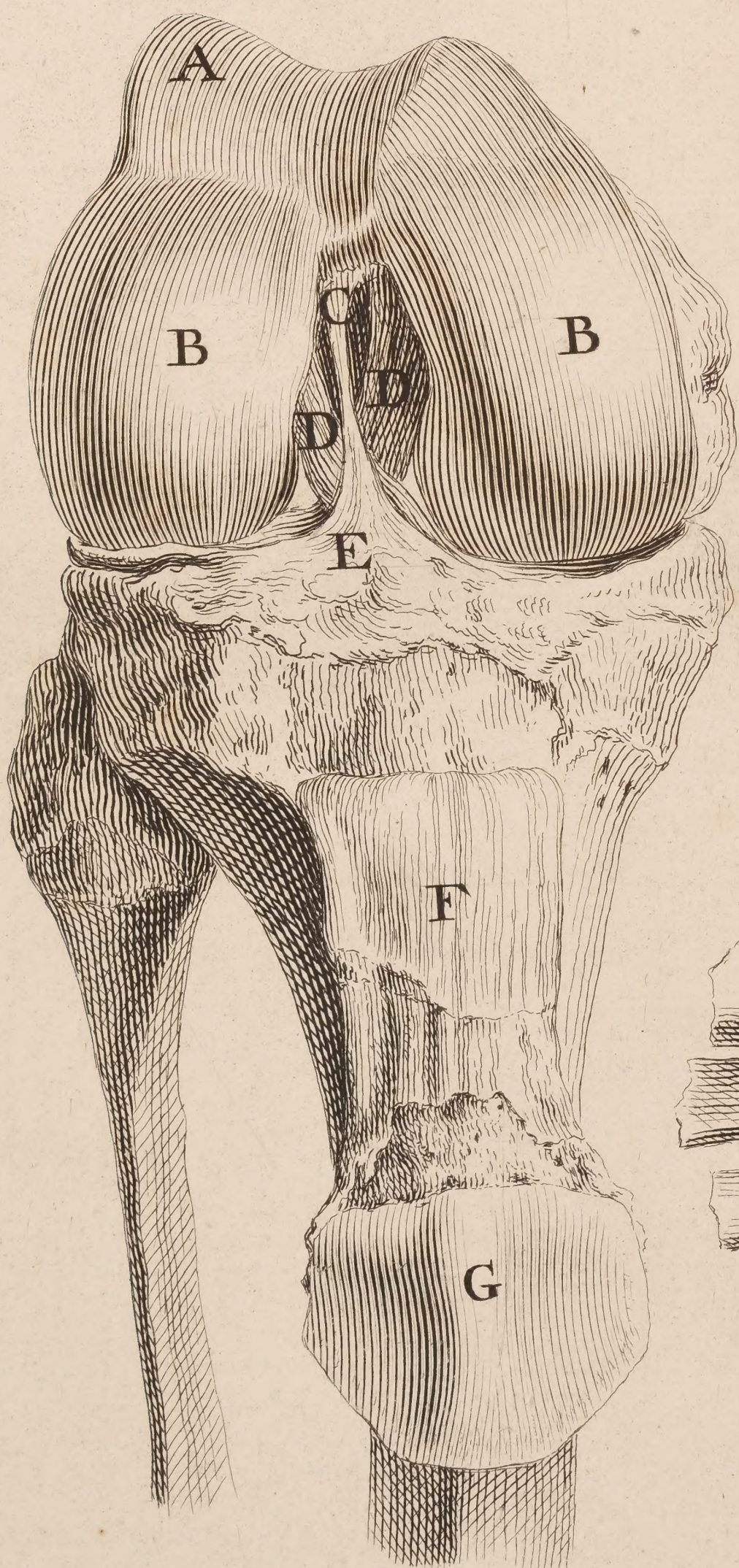


FIG IIII

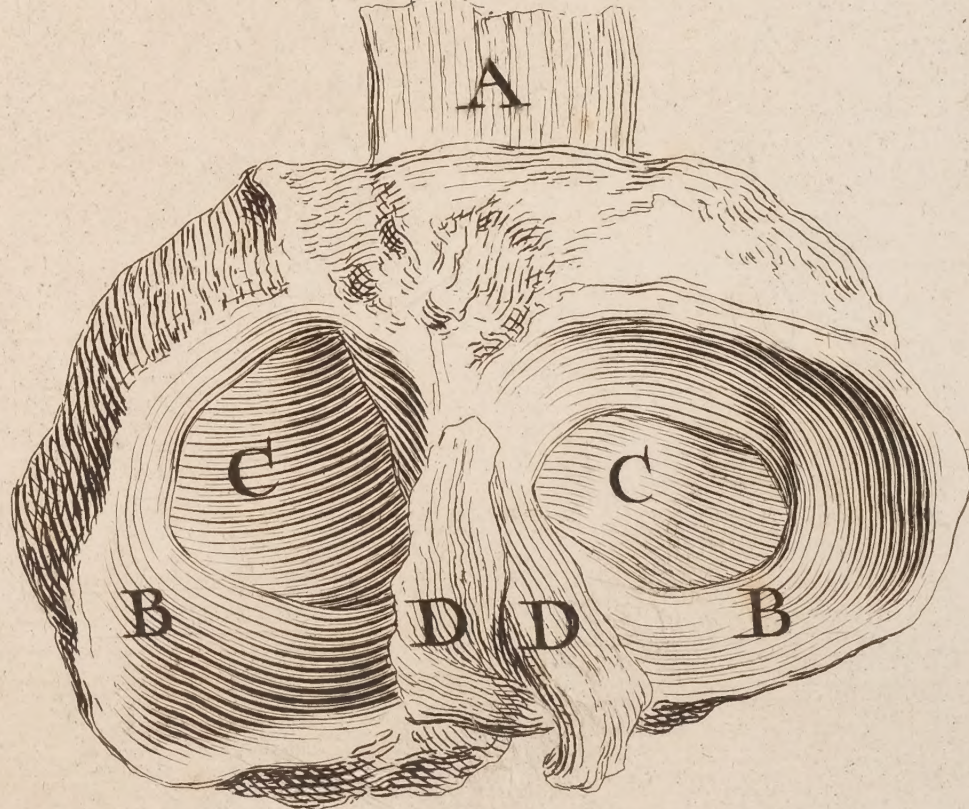


FIG V

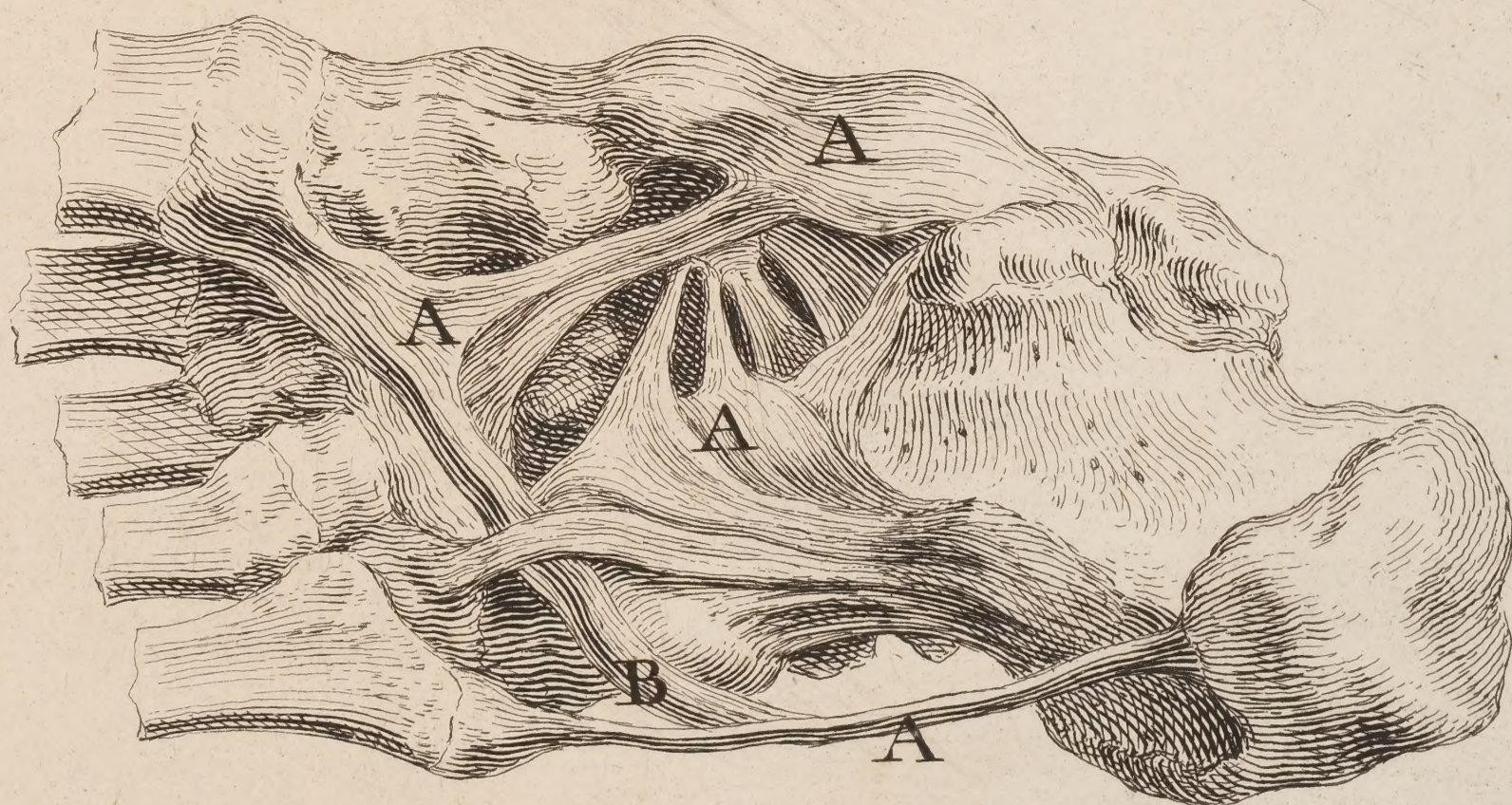


TABLE XLI.

FIG. I.

A woman's skull who died of the venereal disease.

A *The carious part of the skull.*

B *Great part of the upper jaw rotted away.*

FIG. II.

THE skull of a man who died of the venereal disease.

A *The bones of the nose.*

B *The upper jaw.*

CC *The orbits of the eyes.*

DD *Processus jugales.*

EE *Carious parts of the skull, the places which appear in shadow being exfoliated through both tables.*

FIG I

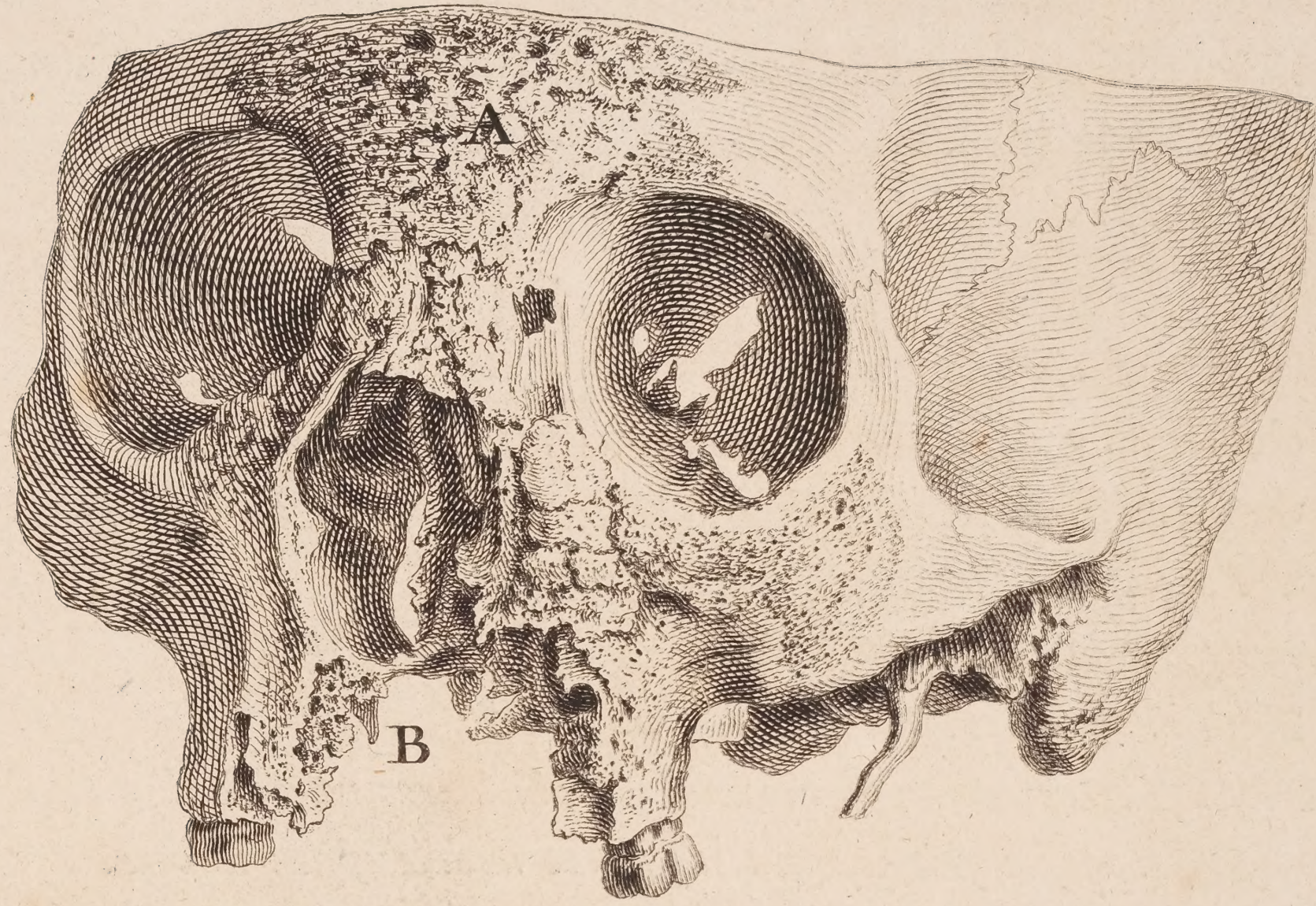


FIG II



TABLE XLII.

FIG. I.

THE caps of two skulls of men who died of the venereal disease, from both which had been many exfoliations: Communicated to me by Mr. *Palmer* late surgeon to the *Lock* hospital.

AAAA *The dura mater appearing in several places.*

FIG. II.

THE jaw of a woman with a large exostosis: the jaw was broke by a fall at seven years old, from which time the exostosis began, and continued to grow twenty years, and then caused her death: Communicated to me by Dr. *Hoddy*.

AA *Part of the jaw.*

B *The place where it was broke.*

C *Teeth in the other side of the jaw.*

DDDD *The extremity of the exostosis which was not entirely united in one mass, and on the opposite side was a tooth in the middle of the tumour.*

FIG I

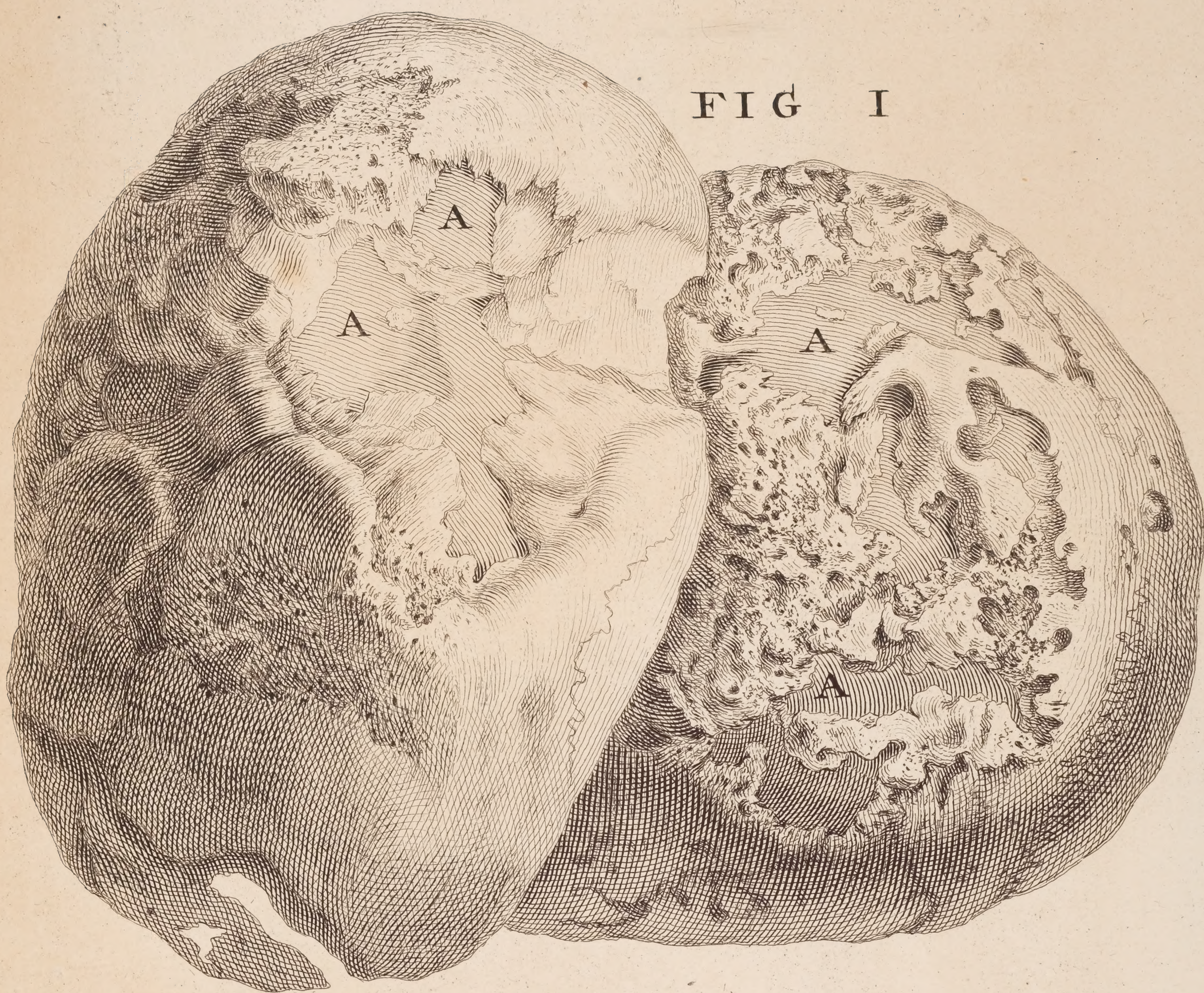


FIG II

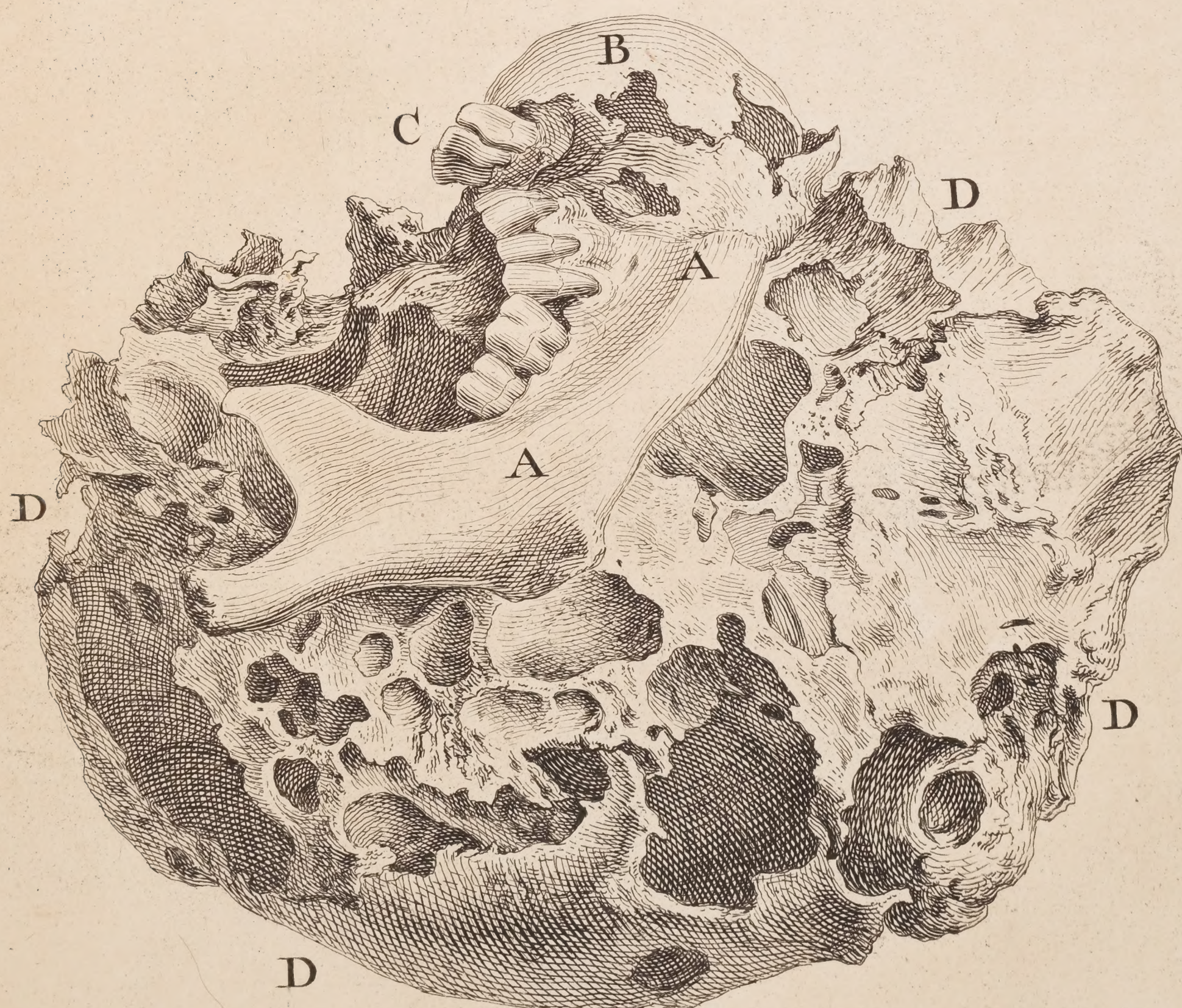


TABLE XLIII.

PART of the trunk of a crooked skeleton (dug out of a grave) in which all the bones were grown together.

2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, *The lower vertebræ of the thorax.*

1, 2, 3, 4, 5, *The vertebræ of the loyns.*

A *Transverse and spinal processes of the upper vertebræ of the back.*

BB *Some of the ribs.*

C *The back part of the vertebræ of the loyns.*

D *Os sacrum.*

EE *Os innominatum.*

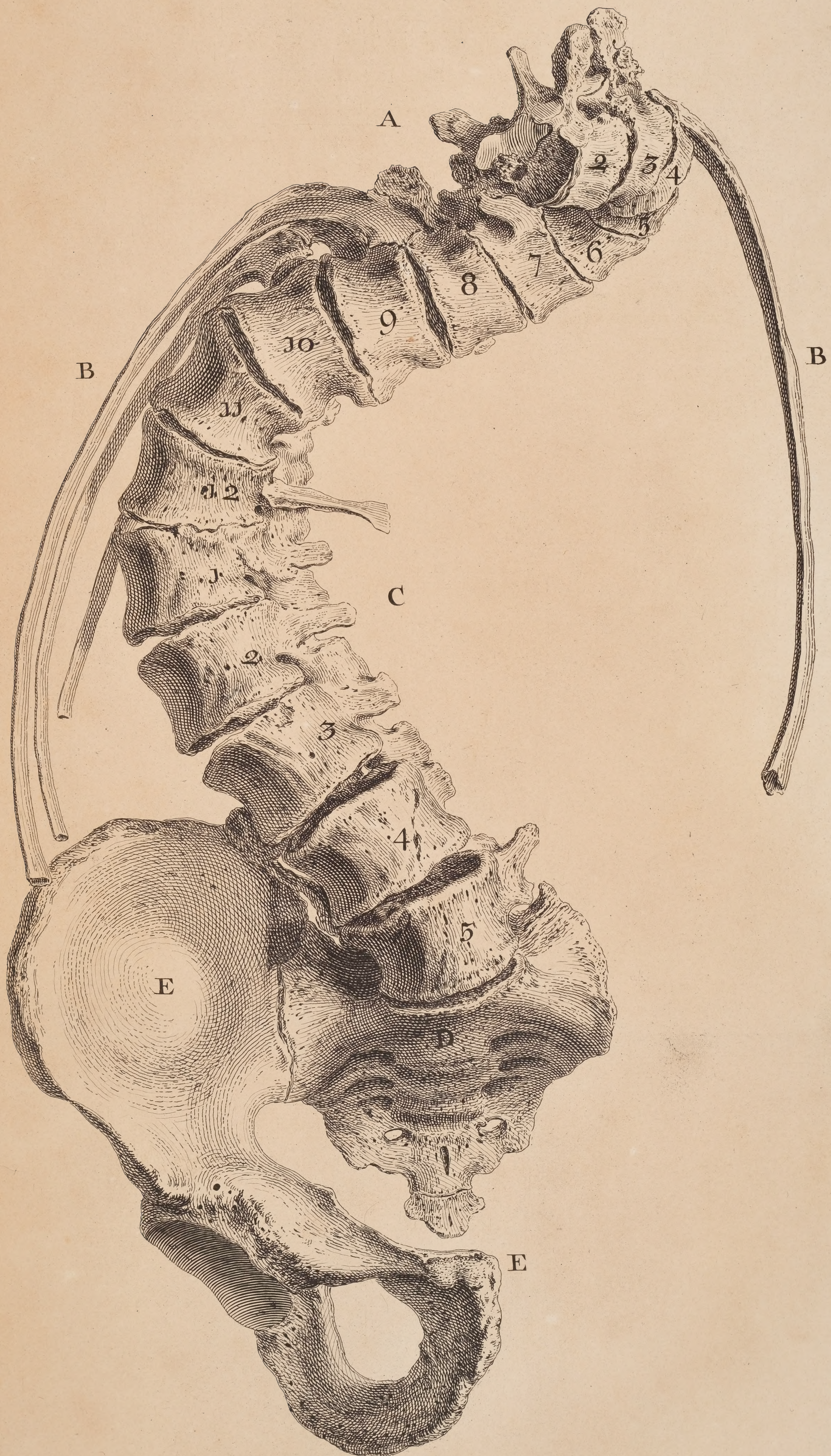


TABLE XLIV.

Two Views of the trunk of a crooked skeleton.

FIG. I.

A *The five lower vertebræ of the neck.*

BB *The ribs.*

C *The vertebræ of the loyns.*

DD *Ossa innominata.*

FIG. II.

A *The three lowest vertebræ of the neck.*

BB *The ribs.*

C *The vertebræ of the loyns.*

DD *Ossa innominata.*

E *Os sacrum.*

F *Os coccygis.*

FIG I

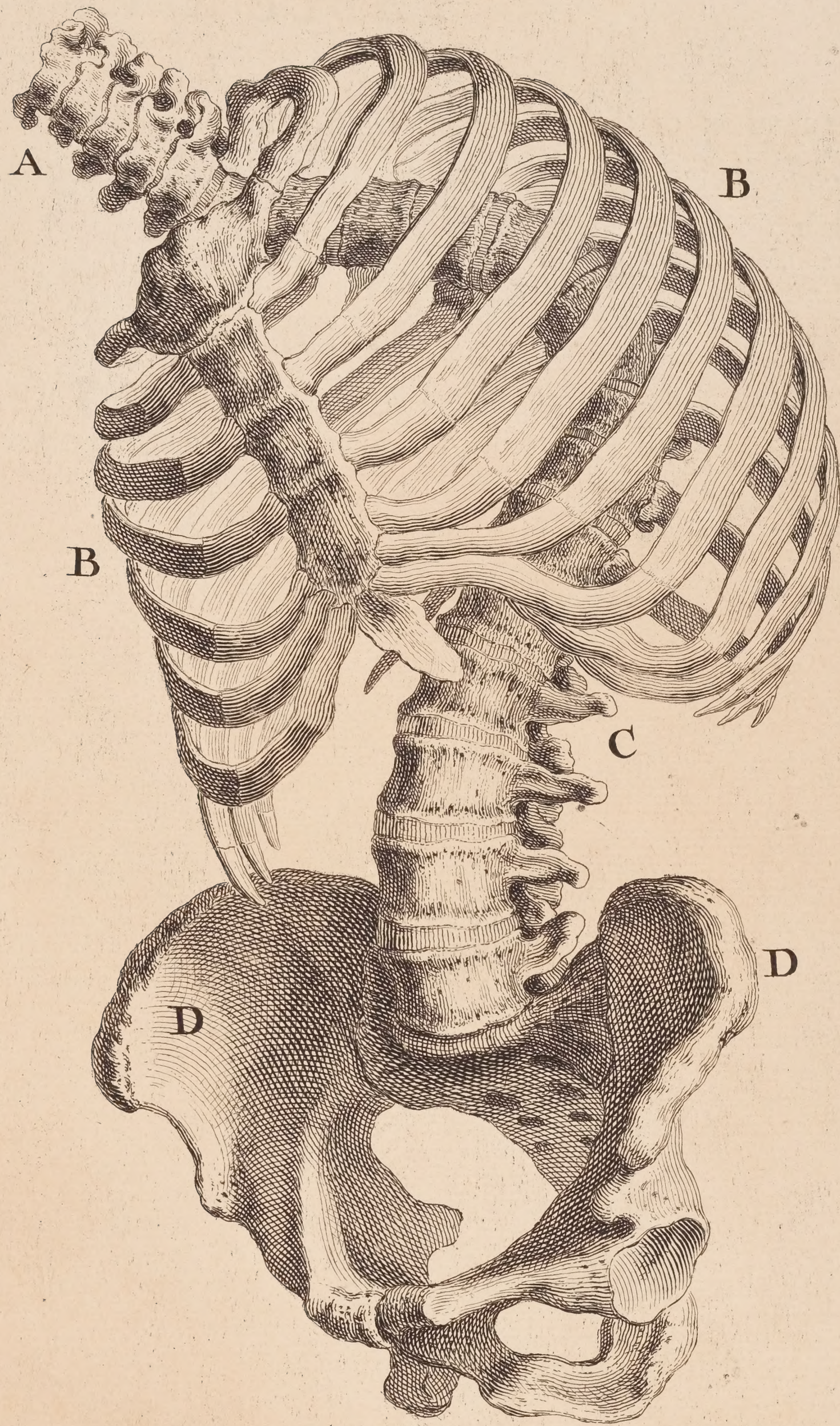


FIG II

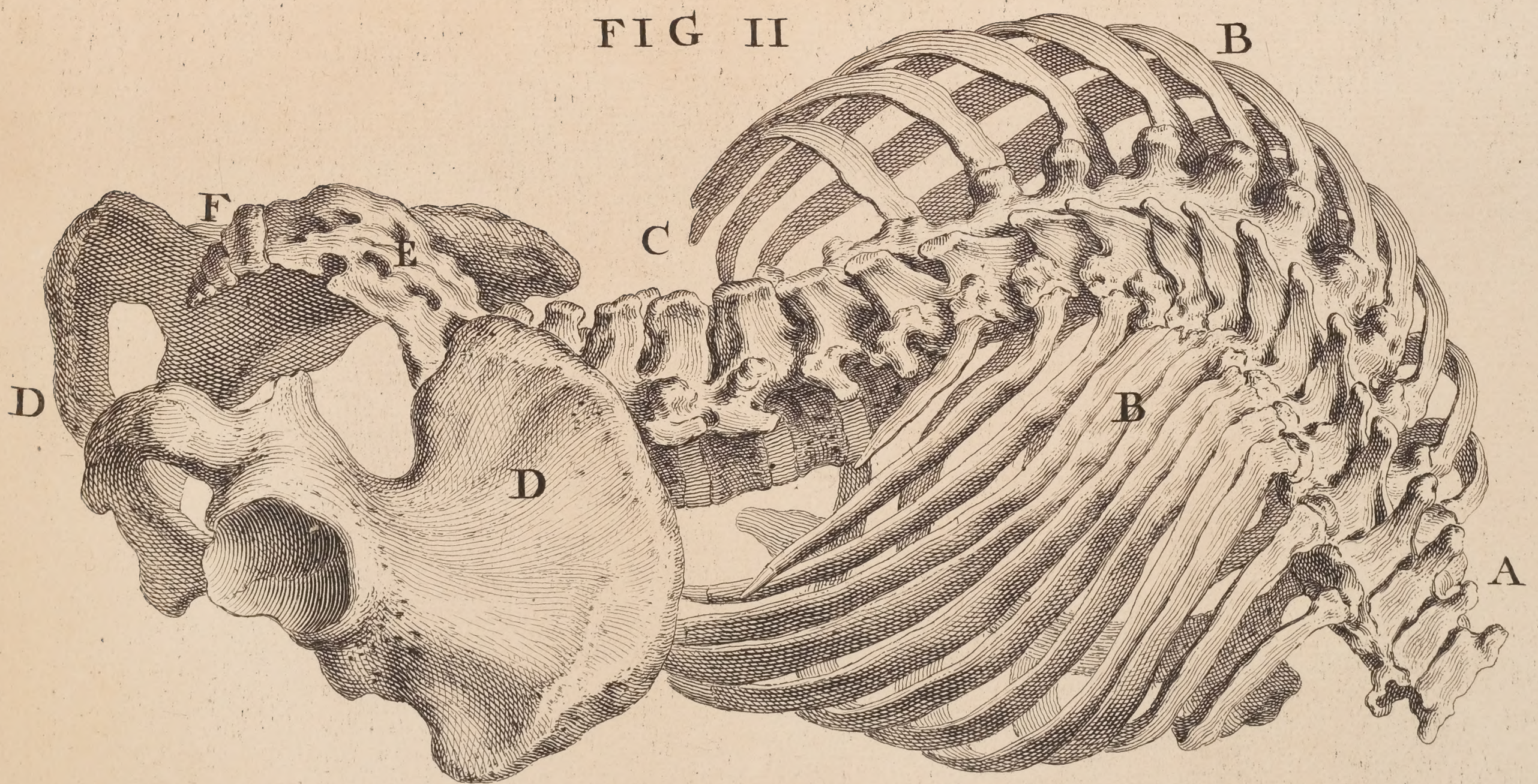


TABLE XLV.

FIG. I.

A DISLOCATION of the os humeri from a fracture of the acetabulum scapulæ, which being broke the os humeri could not be retained in its place.

A *Scapula.*

B *The head of the os humeri.*

FIG. II.

THE bones of the elbow of a person who was born with an anchylosis, communicated to me by Mr. *Goodwin* an eminent surgeon at *Lyn.*

A *Os humeri.*

B *Radius.*

C *Ulna.*

FIG. III.

BONES of a scrophulous thumb.

A *The second bone corroded through.*

FIG. IIIL.

AN anchylosis of the cubit from a fracture.

A *Ulna.*

B *Radius.*

FIG. V.

AN anchylosis of the lower vertebræ of the back.

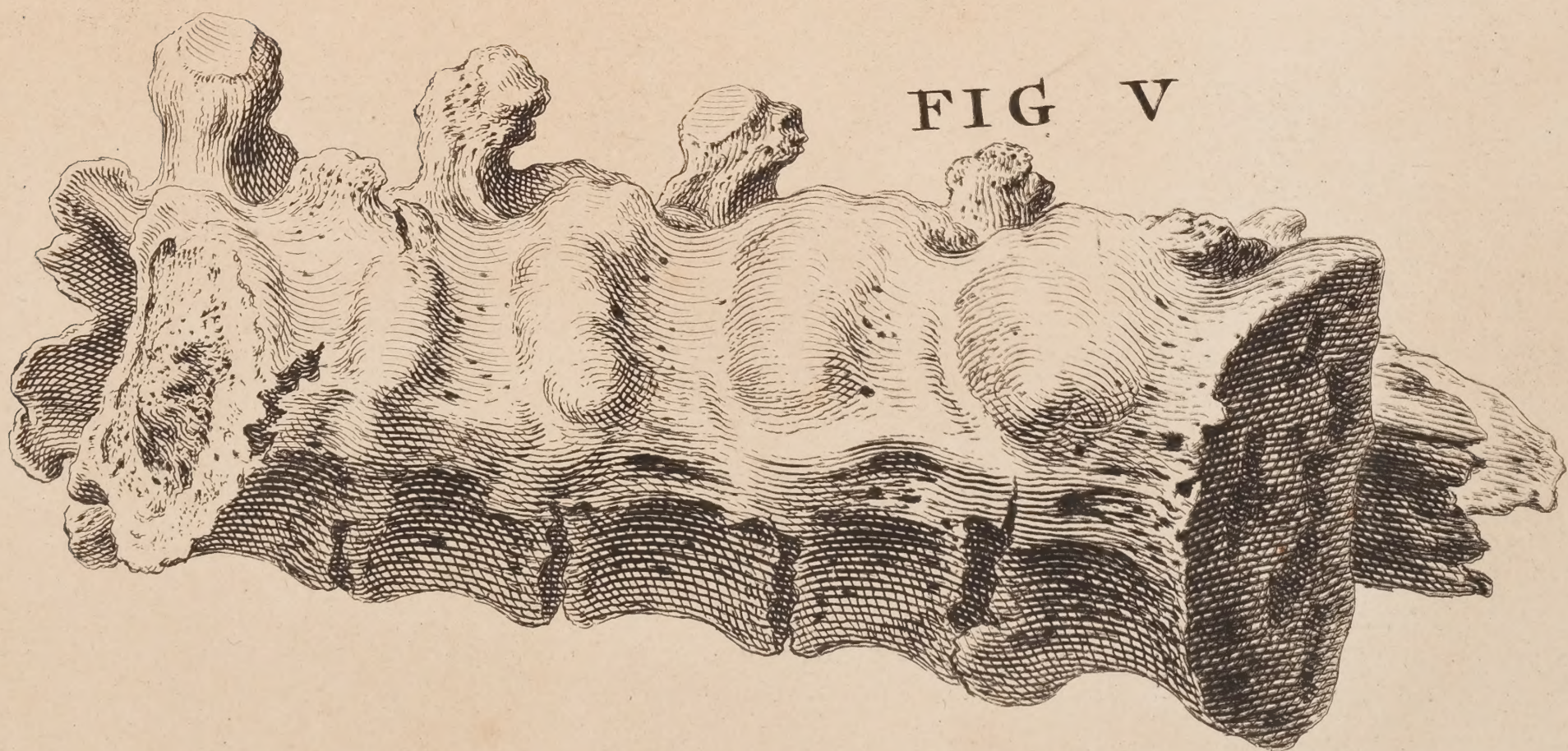
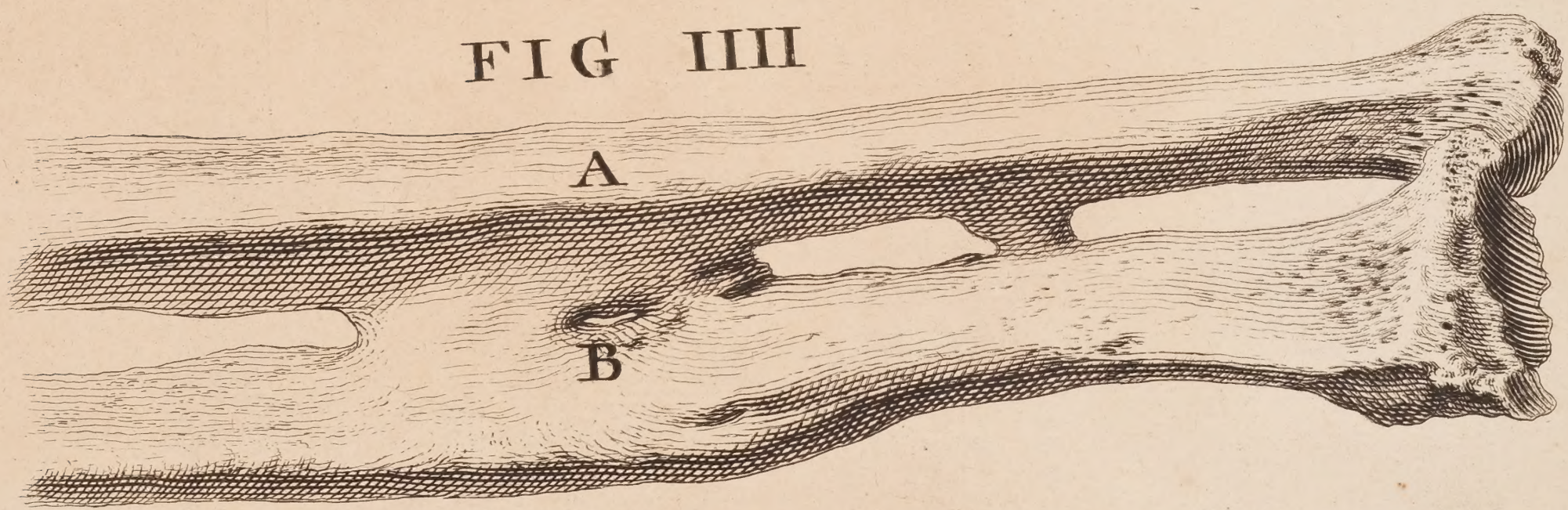
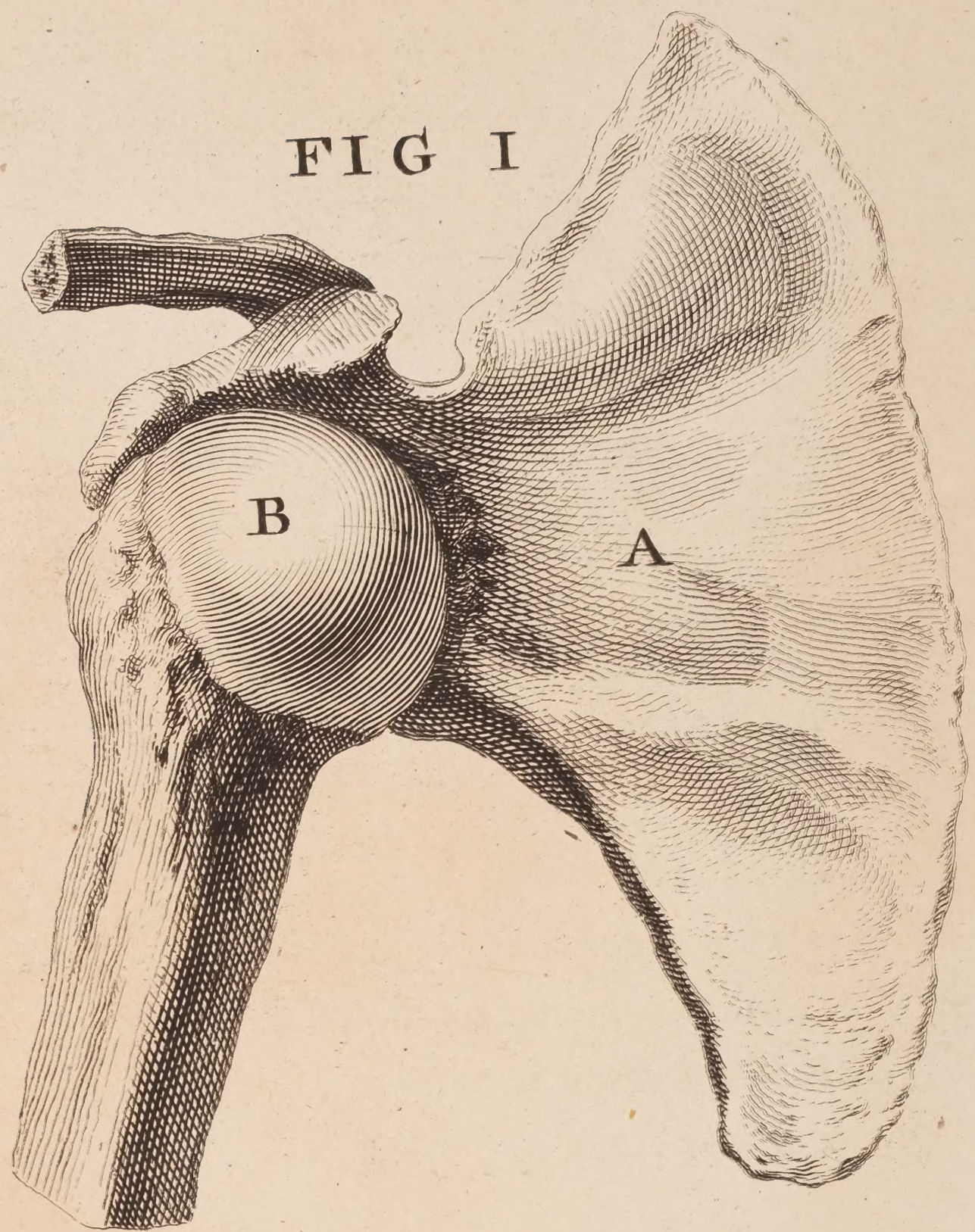
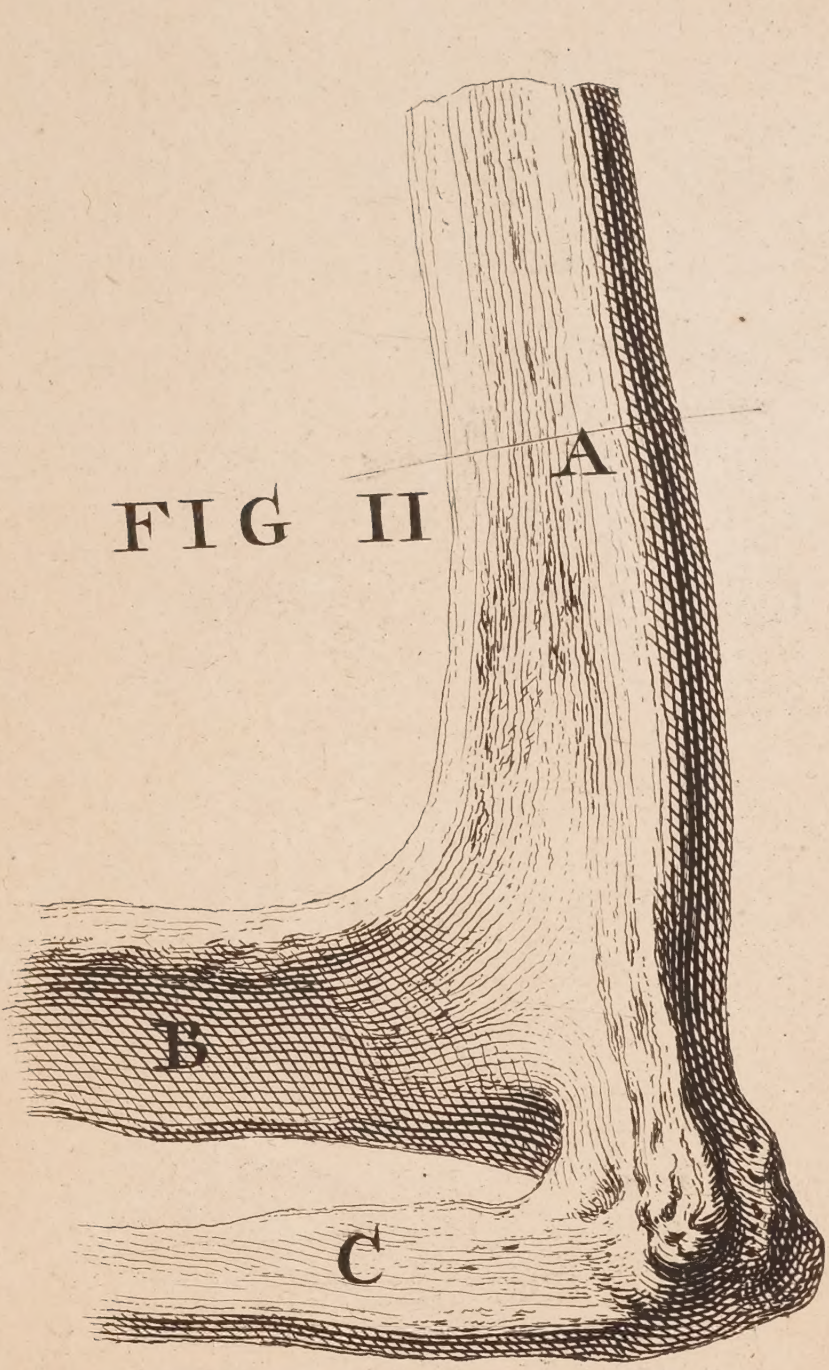


TABLE XLVI.

FIG. I.

THE os innominatum of a young man, who having an abscess formed in the joint of the hip, the matter eroded the socket till it formed a passage into the pelvis of the abdomen, and at length forming also a large abscess on the outside of the thigh; that was opened, and whenever the patient coughed or went to stool, the matter flowed plentifully out of the external wound, as in abscesses of the abdomen. This is not the only case of the kind that I have seen.

A *The perforation in the bottom of the acetabulum.*

BB *Parts made carious by the matter.*

FIG. II.

THE upper end of the os femoris of the same person.

A *The head of the bone much eroded by the matter.*

FIG. III.

A CARIOUS thigh bone of a young woman, who begun to be diseased upon her having menstrual obstructions: Communicated to me by the late Mr. *Dobyns* surgeon to St. Bartholomew's hospital.

AAA *Carious excrescences.*

BB *The lower apophyses.*

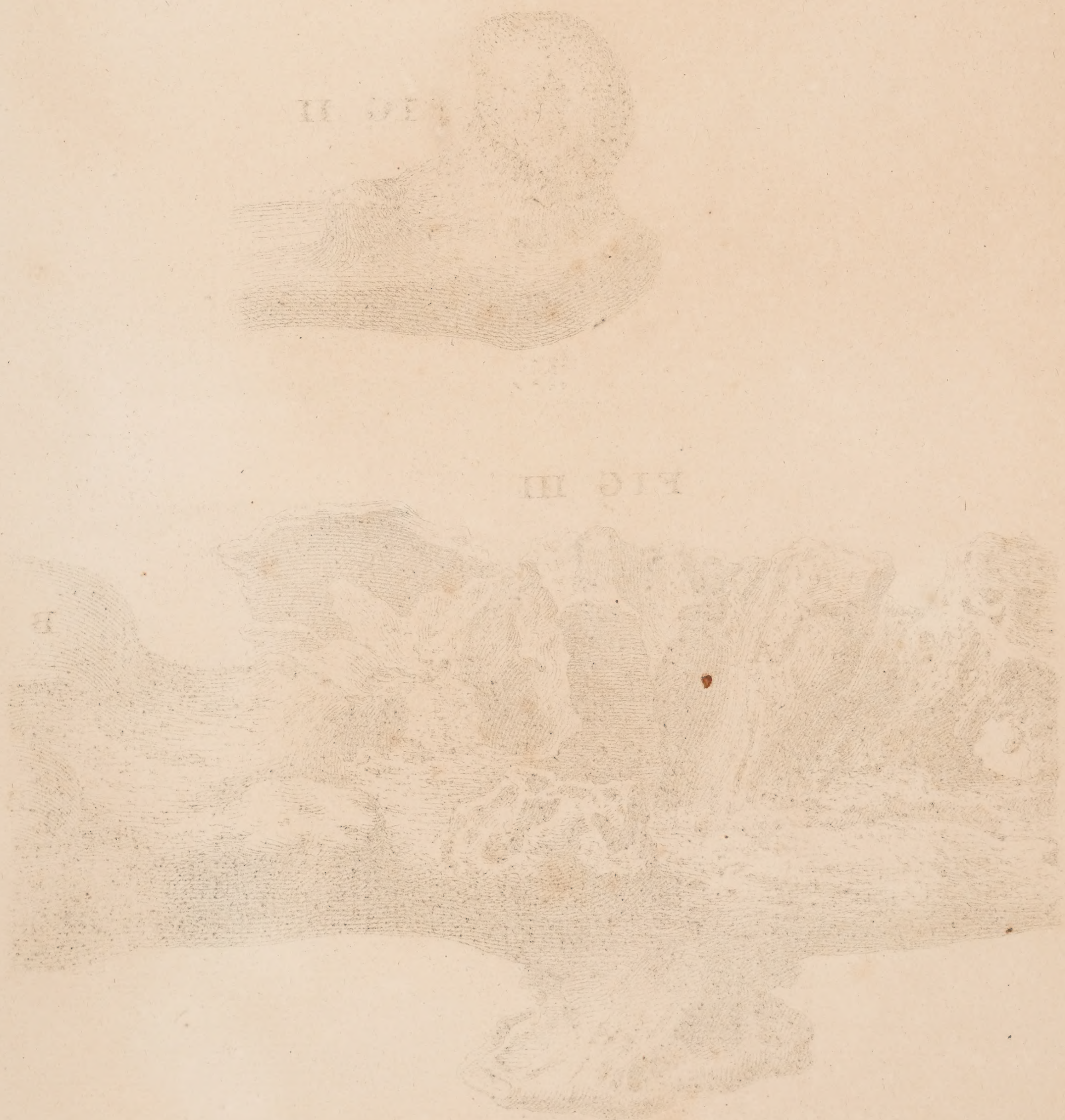


FIG I

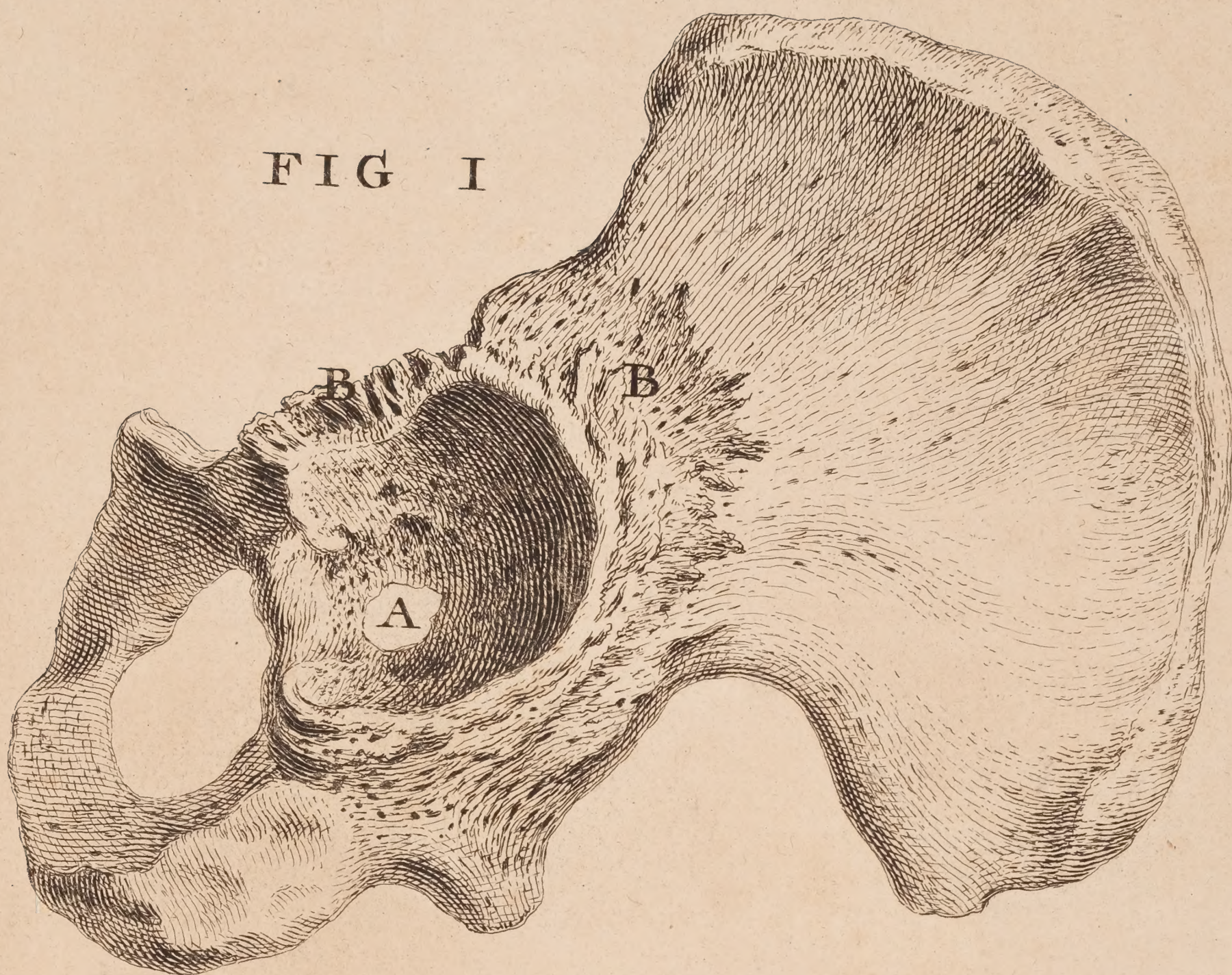


FIG II

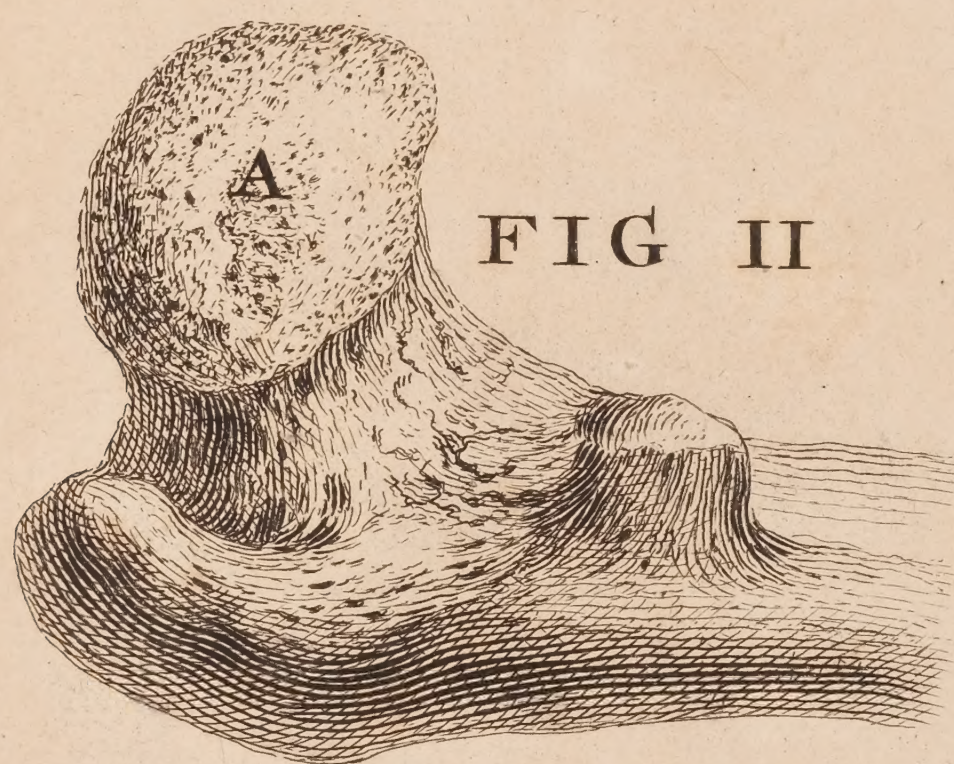


FIG III



TABLE XLVII.

FIG. I.

AN anchylosis of the os innominatum and os femoris: Communicated to me by
Mr. *Westbrook*.

AA *Parts that were broke off.*

B *A part rough and carious.*

FIG. II.

AN anchylosis of the knee: Communicated to me by *Rob. Gay* Esq; late surgeon to
St. *Bartholomew's* hospital.

A *Os femoris.*

B *Patella.*

C *Tibia.*

D *Part of a broken knife sticking in the bone; which had been there from the man's infancy,
and was surely the cause of all the future mischief.*

FIG I



FIG II

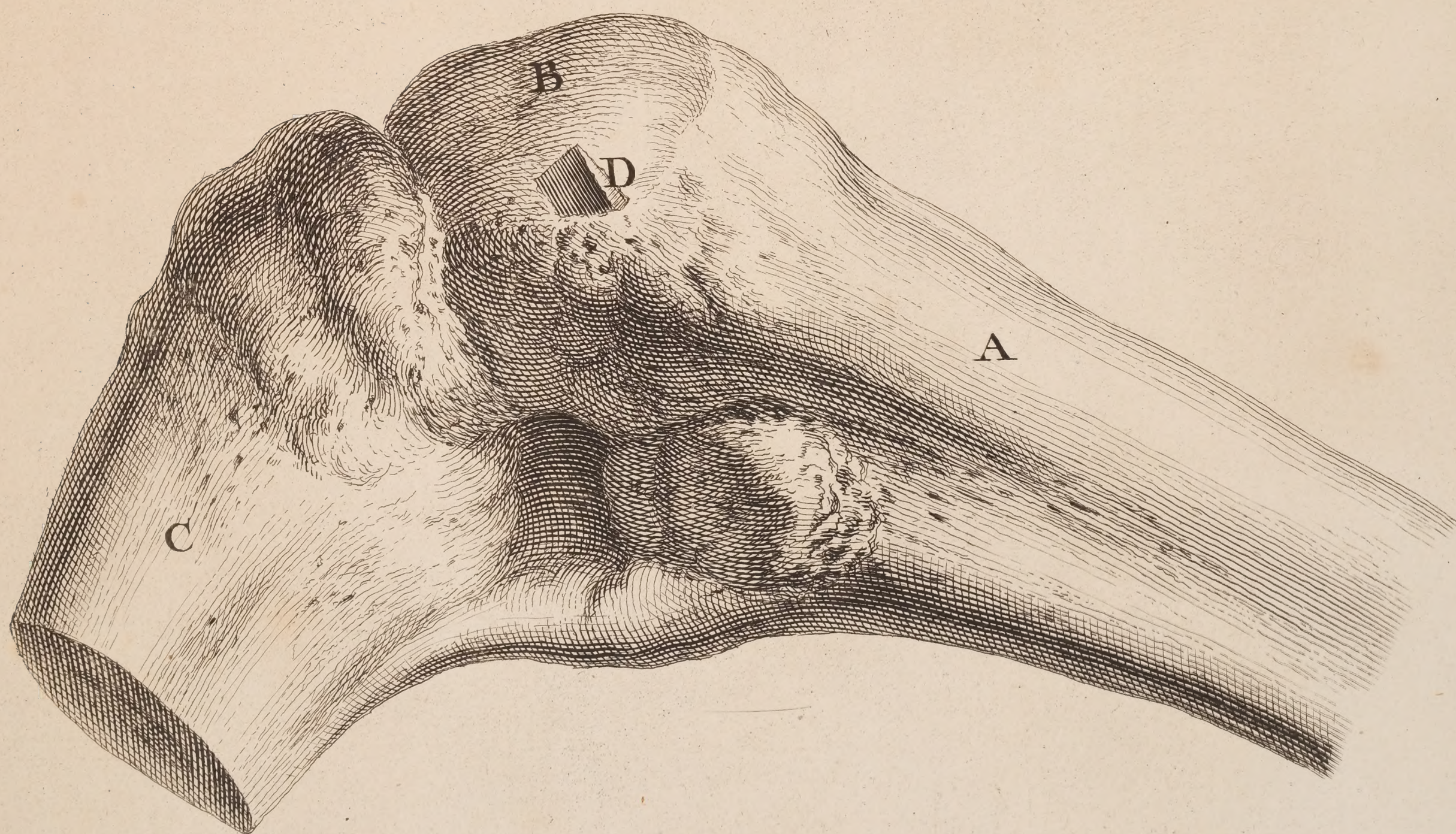


TABLE XLVIII.

BONES of a woman who died of the venereal disease, to whom the scull belonged
Fig. I. Tab. XLI. and who had scarce one sound bone: Communicated to me by
Mr. Dansie, surgeon to *King'sland* hospital.

FIG. I. *Os femoris.*

- A *The head.*
- B *Trochanter major.*
- C *Trochanter minor.*
- D *The carious part.*
- EE *The lower apophyses.*

FIG. II. *Os humeri.*

- A *The head.*
- B *A process.*
- CC *The carious part.*
- D *The large sinus.*
- E *The lower cartilaginous end.*
- F *The inner protuberance.*

FIG. III. *Tibia.*

- A *The insertion of the patella.*
- BB *The carious part.*
- C *The protuberance that forms the inner ankle.*

FIG. IIII. *Fibula.*

- A *The upper end.*
- B *The carious part.*
- C *The lower end.*



FIG II



FIG III



FIG IIII



TABLE XLIX.

FIG. I.

THE upper end of a thigh bone, in which matter being formed in the medullary cavity, encreased till it burst the bone, and made it carious both within and without: Communicated to me by Mr. *Ferne*, surgeon to St. *Thomas's* hospital.

A *The head.*

BB *The parts broken and carious.*

FIG. II.

THE lower part of the same bone.

AA *Carious parts.*

BB *The lower apophyses.*

FIG. III.

A KNEE dislocated from an impostumation in the joynt, commonly call'd a white swelling: Communicated to me by the late Mr. *Paul*, surgeon to St. *Thomas's* hospital.

A *Os femoris.*

B *Patella.*

C *The lower end of the os femoris.*

D *The upper end of the tibia.*

E *Fibula.*

FIG. IIII.

A GREAT part of the os humeri, including all the medullary cavity, of a young woman thirteen years of age; who after a favourable small pox, found a swelling appear on her arm and shoulder, which soon after suppurated and broke a little below the head of the os humeri, and continued open for three years, when she was brought to Mr. *Goodrich*, surgeon in *Ipswich*, July 1732. He open'd a sinus about two inches downward towards the elbow, and continued to dress it till the *December* following; he then took out this piece, which left every where, except where the wound was, as I judge from its appearance, portions of the external surface (from which I suppose the callus flow'd which supply'd the place of this bone.) After the taking away of this bone, there was a great effusion of blood, nevertheless she mended daily, tho' for two years together at times, little bits of bone came away; but being cur'd she recover'd so good a use of her arm, as to be able to carry a pail of water, and having no other deformity in it, but what arises from the wound.

A *The place of the wound.*

BB *Places where the medullary cavity appears.*

FIG. V.

THE upper end of the tibia of a boy made carious from a scrophulous habit of body.

A *The upper end carious.*

B *The middle of the bone sound.*

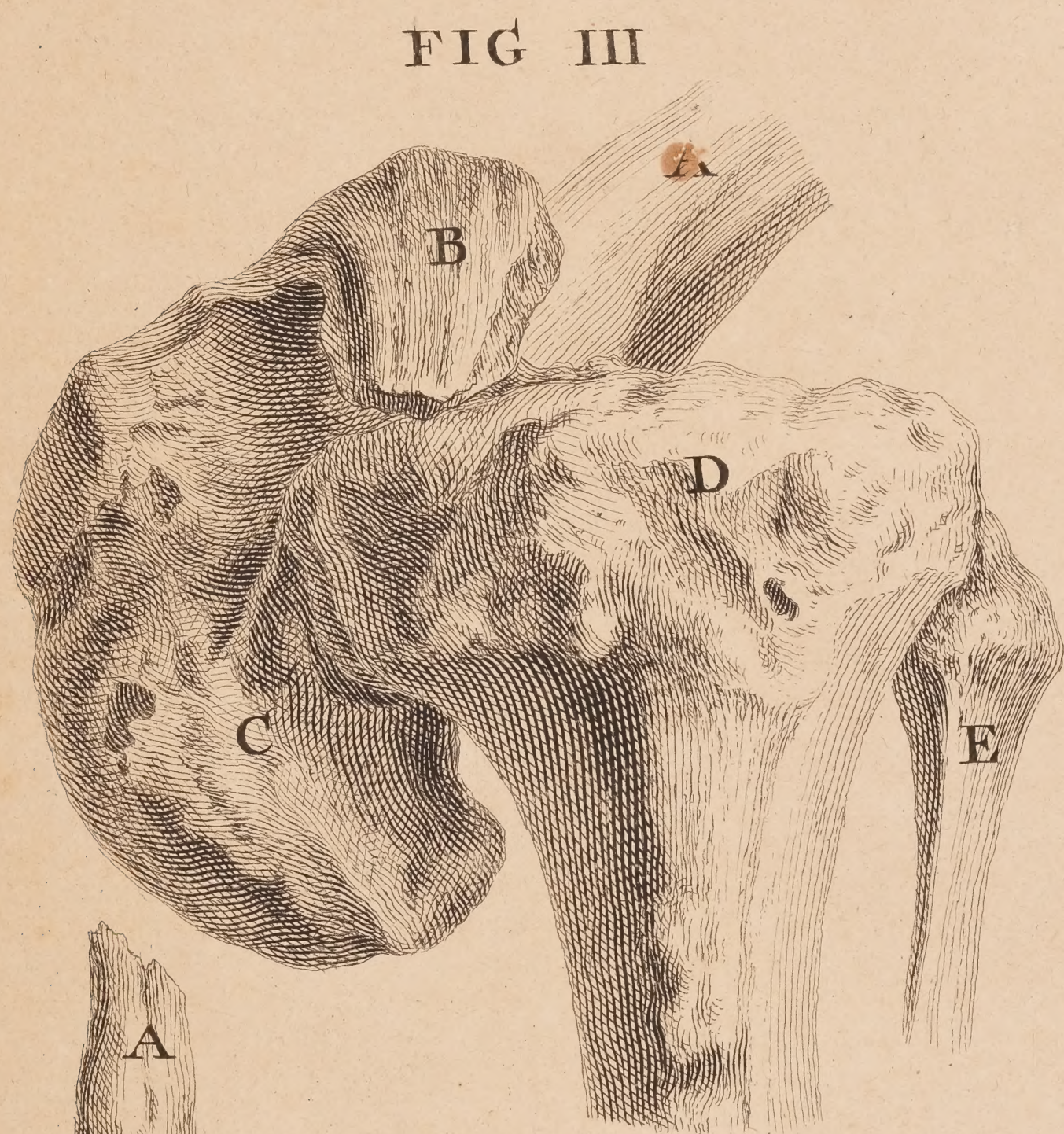


TABLE L.

FIG. I. FIG. II.

THE thigh bones of a soldier who was shot in the right groin at the siege of *Gibraltar*; who being brought home the next winter, died soon after of a dropfy: The right thigh bone was wasted so much as appears in the draught, and being weighed after they were both sawed lengthways with a fine saw, the right weighed less than half the weight of the other.

FIG. III.

THE upper end of a thigh bone fractured near the joynt, in which case the limb always shortens, and has usually been mistaken for a dislocation.

A *The head of the bone.*

B *The great trochanter.*

C *The lesser trochanter.*

D *The fracture.*

FIG. IIII.

A FRACTURE at the lower end of the thigh bone ill set.

AA *The callus shot out into processes.*

B *Another callous process.*

L

FIG I

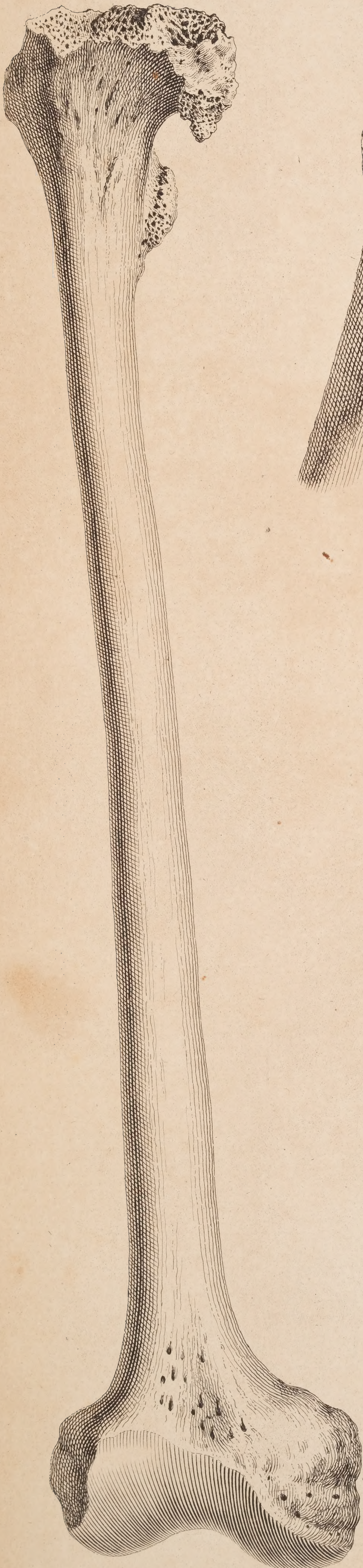


FIG II



FIG III



FIG III

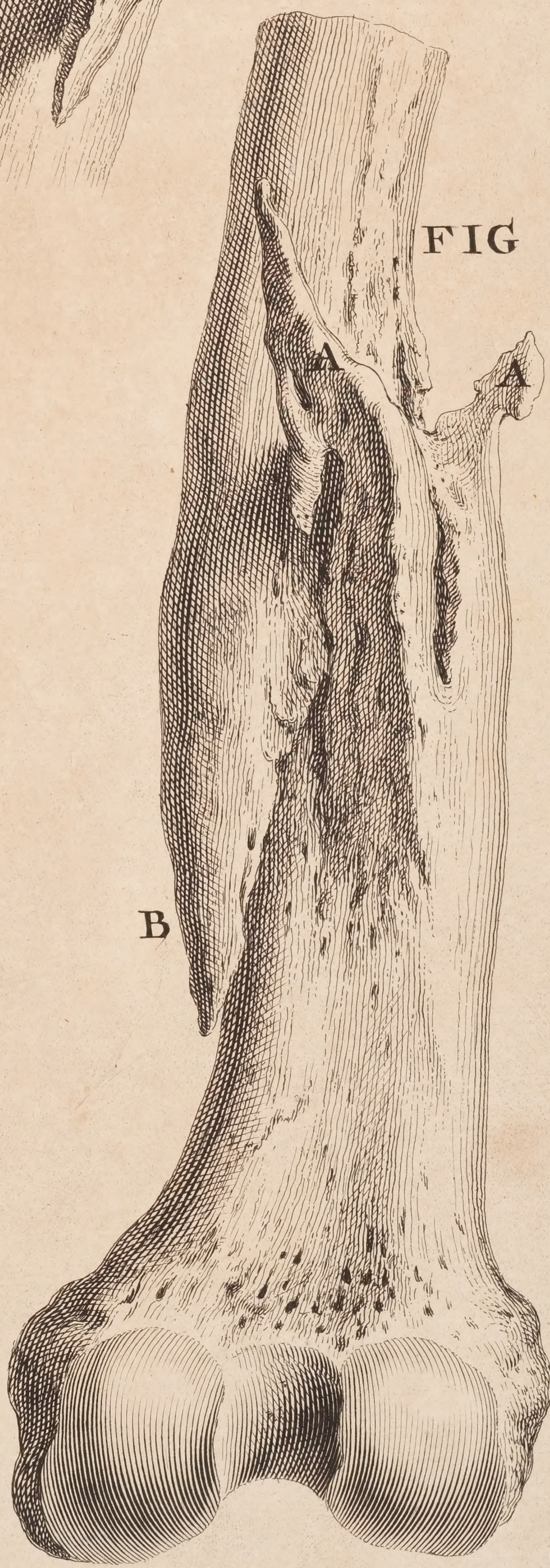


TABLE LI.

FIG. I.

A THIGH bone broke in two places: Communicated to me by Mr. *Westbrook*, a surgeon in *Westminster*.

A *The upper fracture.*

B *The lower fracture not less than the other, tho' it does not appear so large, being in perspective.*

FIG. II.

THE upper part of a thigh bone.

A *A large bony excrescence.*

FIG. III.

THE lower end of the thigh bone, in which an anchylosis was begun.

A *The patella united to the os femoris.*

BB *Parts united to the tibia, which being separated with a little force appeared bloody like a bone from which a carious part is too soon forced off.*

C *A small part on which the cartilage yet remained.*

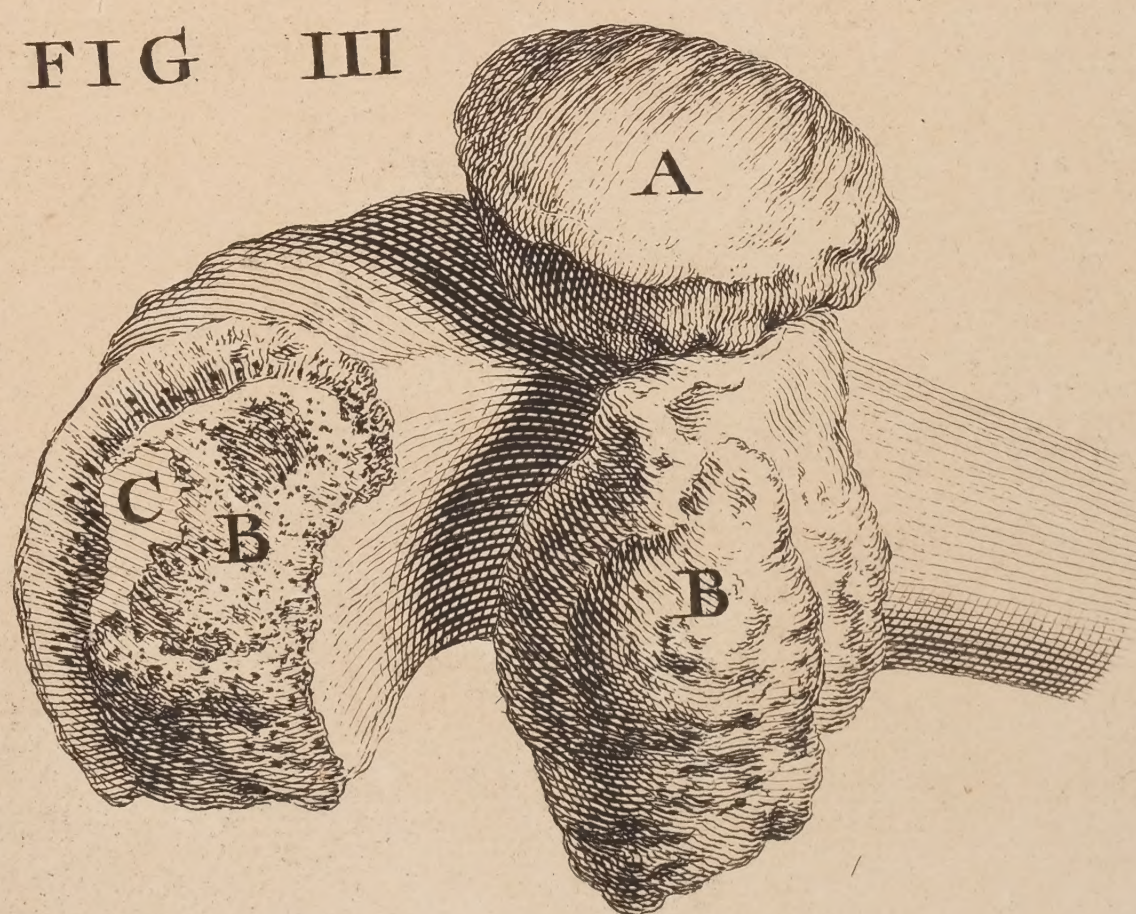


TABLE LII.

FIG. I.

THE upper half of the tibia carious.

A *The upper end.*

B *A little part sound, which was casting off from the unsound: This and the following bone were both communicated to me by John Ranby Esq; surgeon to the household.*

FIG. II.

CARIOUS bones with many calous pointed excrescences.

A *Tibia.*

B *Fibula.*

C *The end next the tarsus.*

FIG. III.

THE tibia of a man who had had the rickets: Communicated to me by Mr. *Westbrook*, surgeon in *Westminster*.

A *A place which the fibula pressing upon had worn smooth.*

FIG I



FIG II

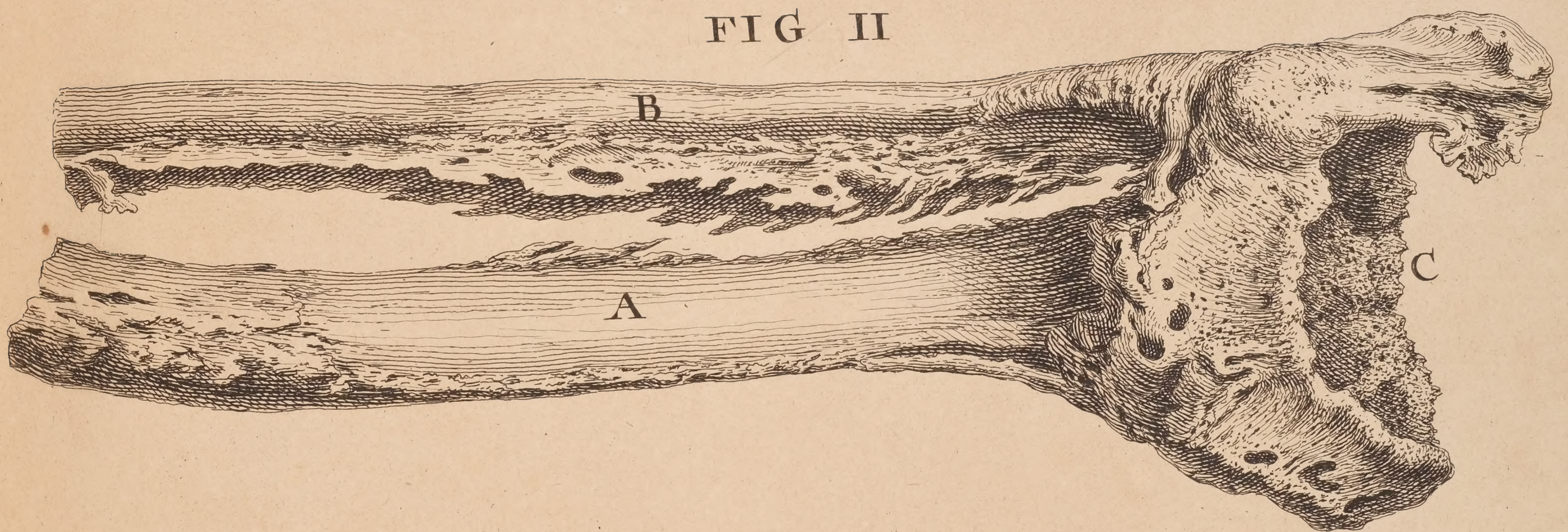


FIG III

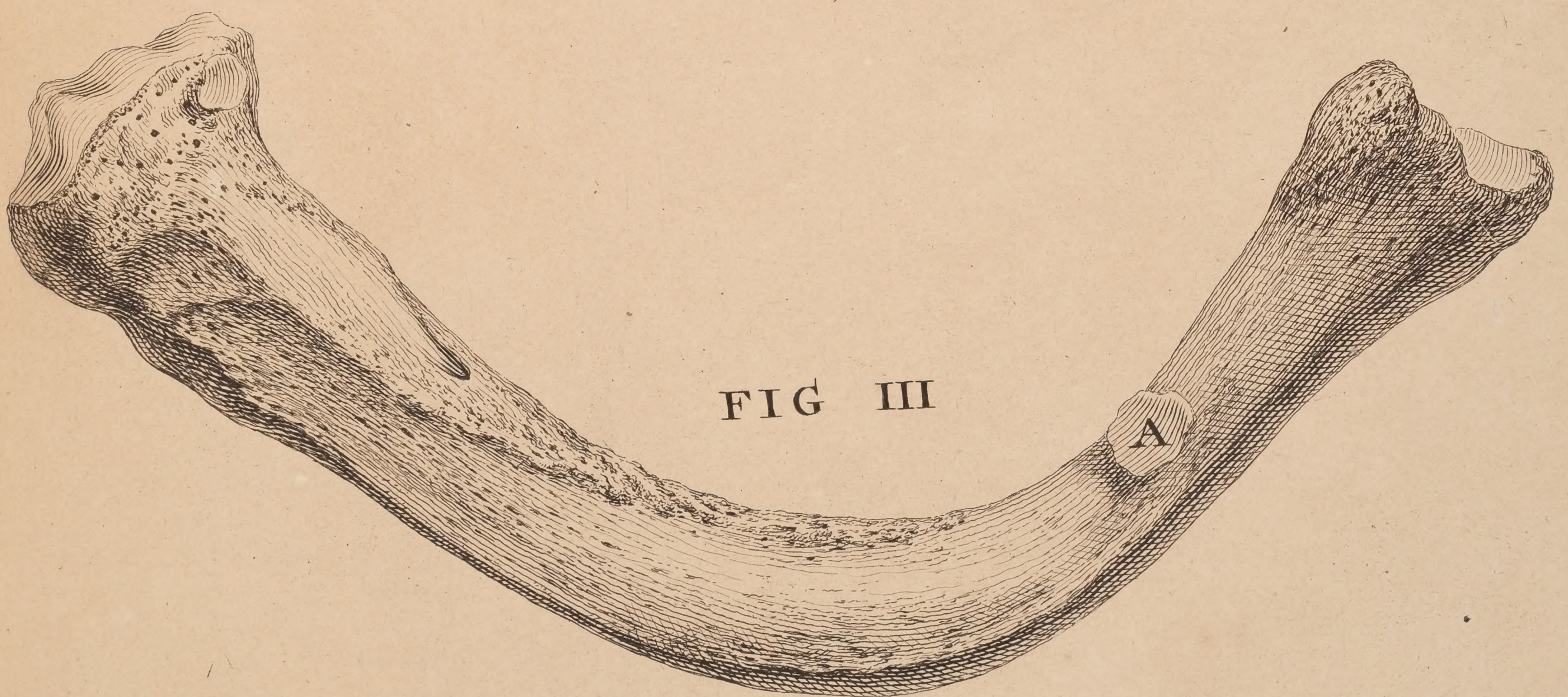


TABLE LIII.

A MOST remarkable exostosis of the tibia, drawn just half its diameter: Communicated to me by Mr. *Green*, surgeon to St. *Bartholomew's* hospital.

FIG. I.

THE exostosis on the upper and forepart of the tibia.

A *The lower end of the tibia.*

FIG. II.

THE back part of the same bone.

A *The upper end of the tibia.*

B *The lower end between which the bone is twisted.*

FIG. III.

THE fibula altered in its shape from the pressure of the exostosis on the tibia.



FIG I



FIG III



FIG II



TABLE LIV.

FIG. I.

THE tibia and fibula joyned by a callus.

AA *Tibia.*

B *Fibula.*

FIG. II. FIG. III.

AA, AA *Tibia and fibula joyned by a callus.*

FIG. IIII.

AN anchylofis.

A *Tibia.*

B *Fibula.*

C *The metatarsal bones.*

D *Part broke off from the bones of the tarsus, which were all joyned in one.*

FIG I

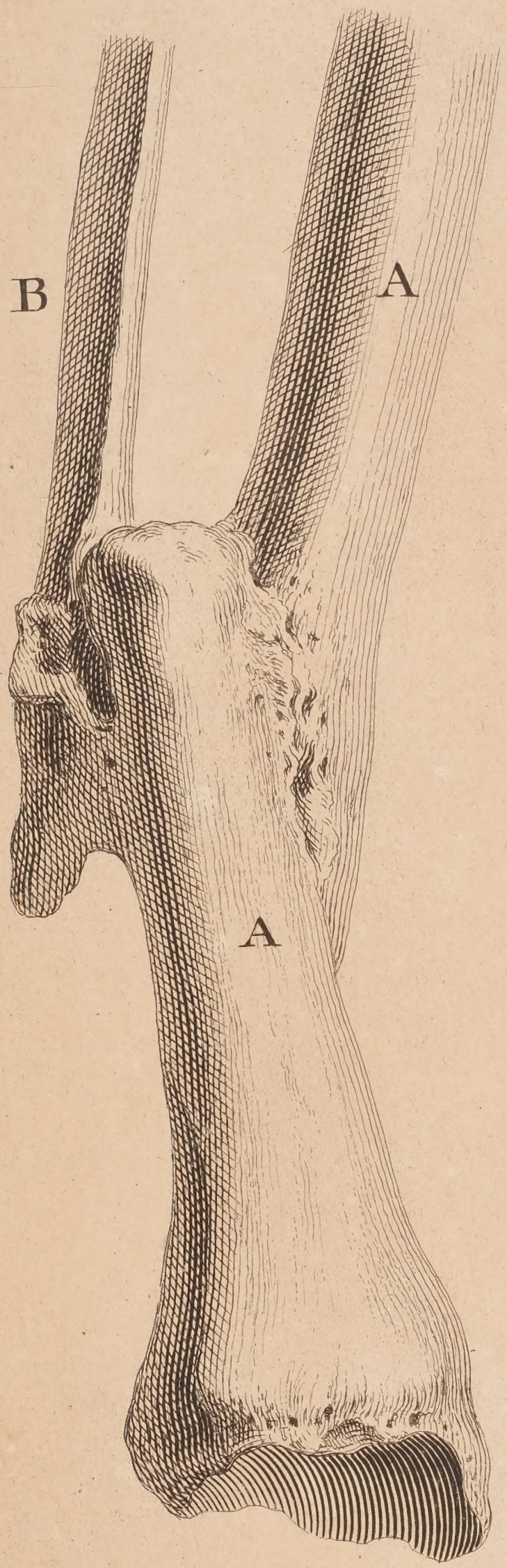


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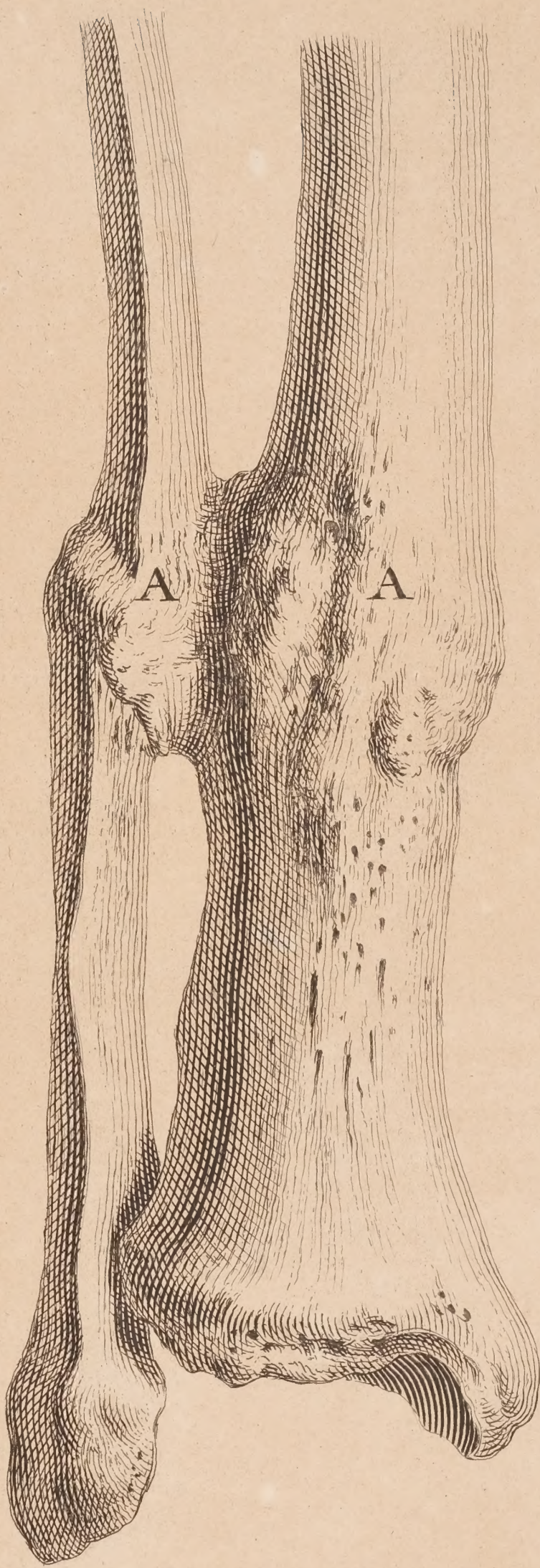


FIG III

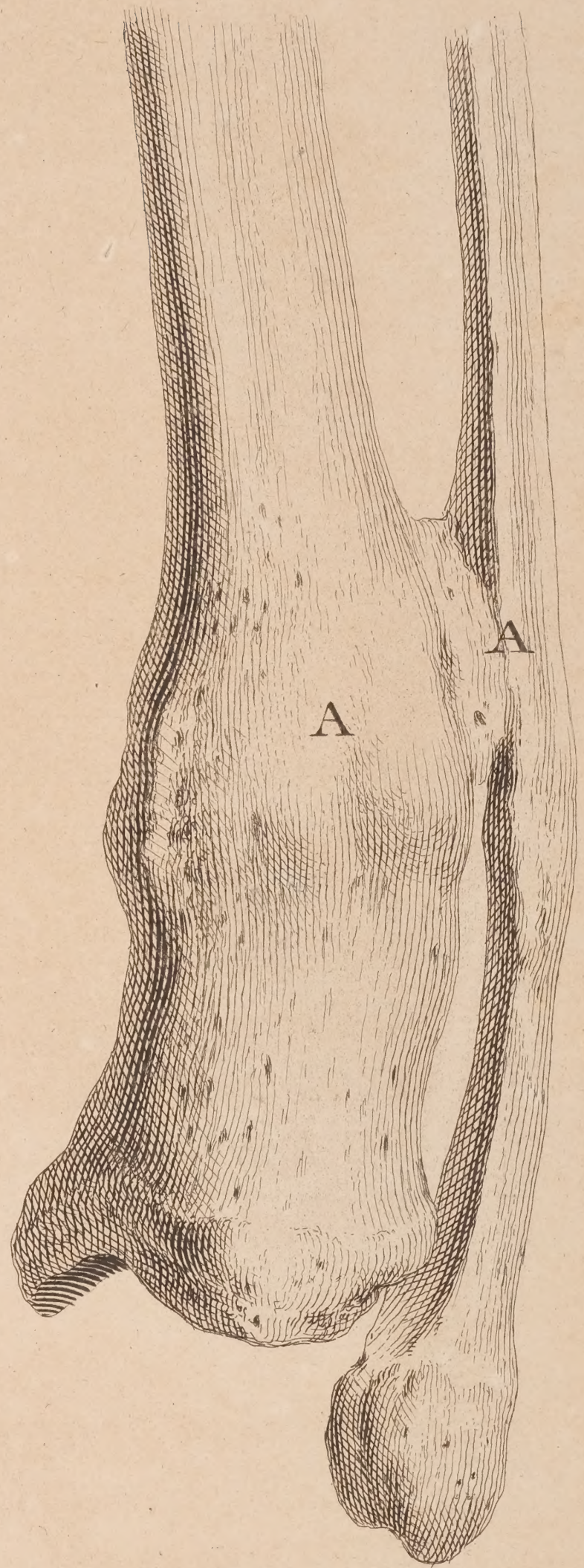


FIG IIII

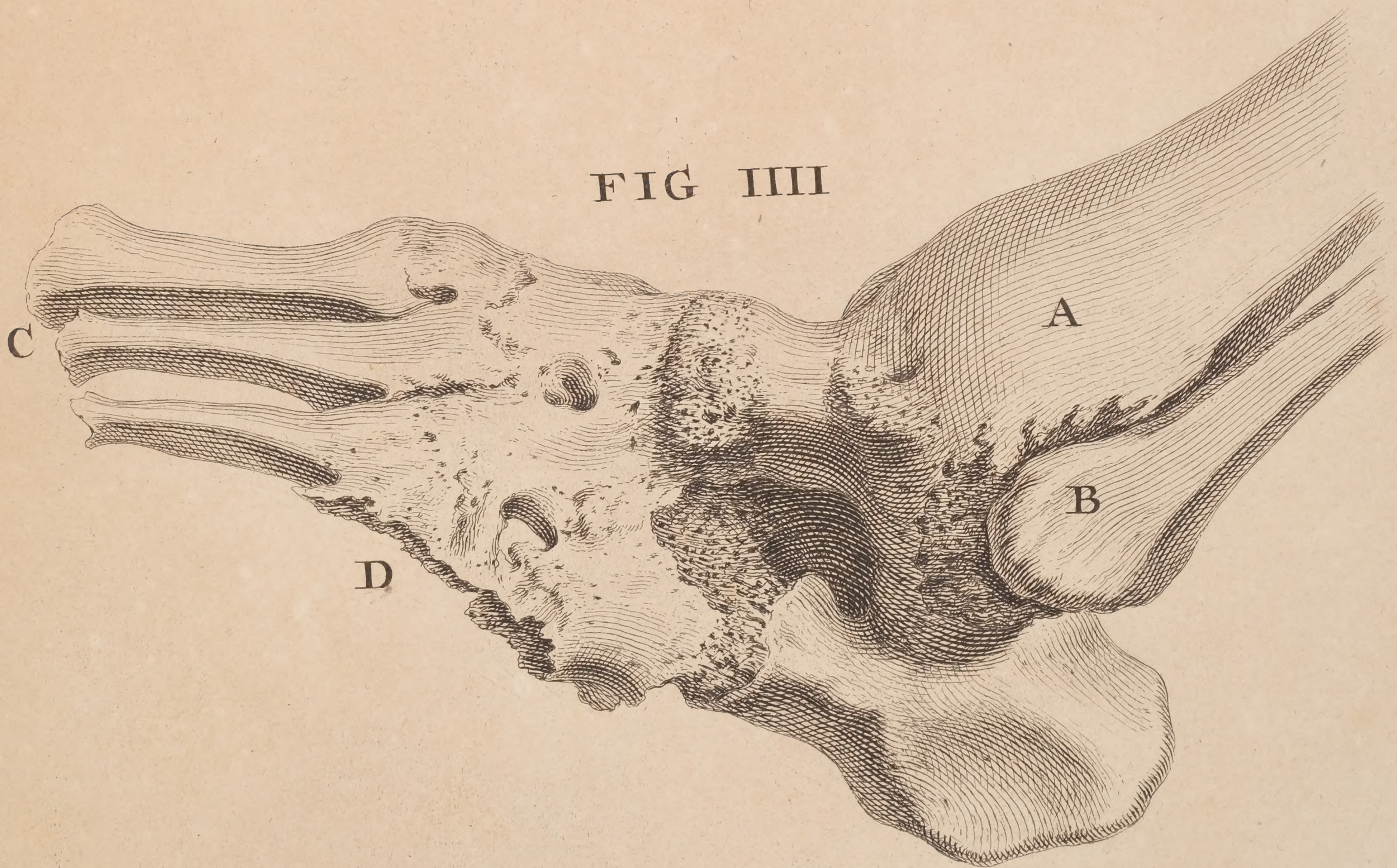


TABLE LV.

DISEASED bones: Communicated to me by Monsieur *Morand*.

FIG. I.

THE humeri of an officer thus diseased from a gunshot wound.

- A Parts of the inner part of the bone separated from the external part, which is much distended.
- BB Other orifices in the external part of the bone, through which there was so large a discharge of matter, that the patient died of it.
- CC The external part of the bone carious.

FIG. II.

THE inner part of the same bone (seen at A A) separately drawn.

- A The upper end.

FIG. III.

- A FRACTURE of the socket of the os innominatum downwards, which made a new kind of socket, but of no use.

- A Os pubis.
- B Os ischii.
- C Part of the natural socket beat inwards.
- D The head of the os femoris.
- EE Part of the preternatural socket.
- F The upper and back part of the os femoris,

FIG. IIII.

ANOTHER view of the same bone.

- A The obtuse process of the ischium.
- B The acute process.
- C The head of the os femoris.
- D Part of the natural socket of the os innominatum.

FIG I



FIG

II



FIG III

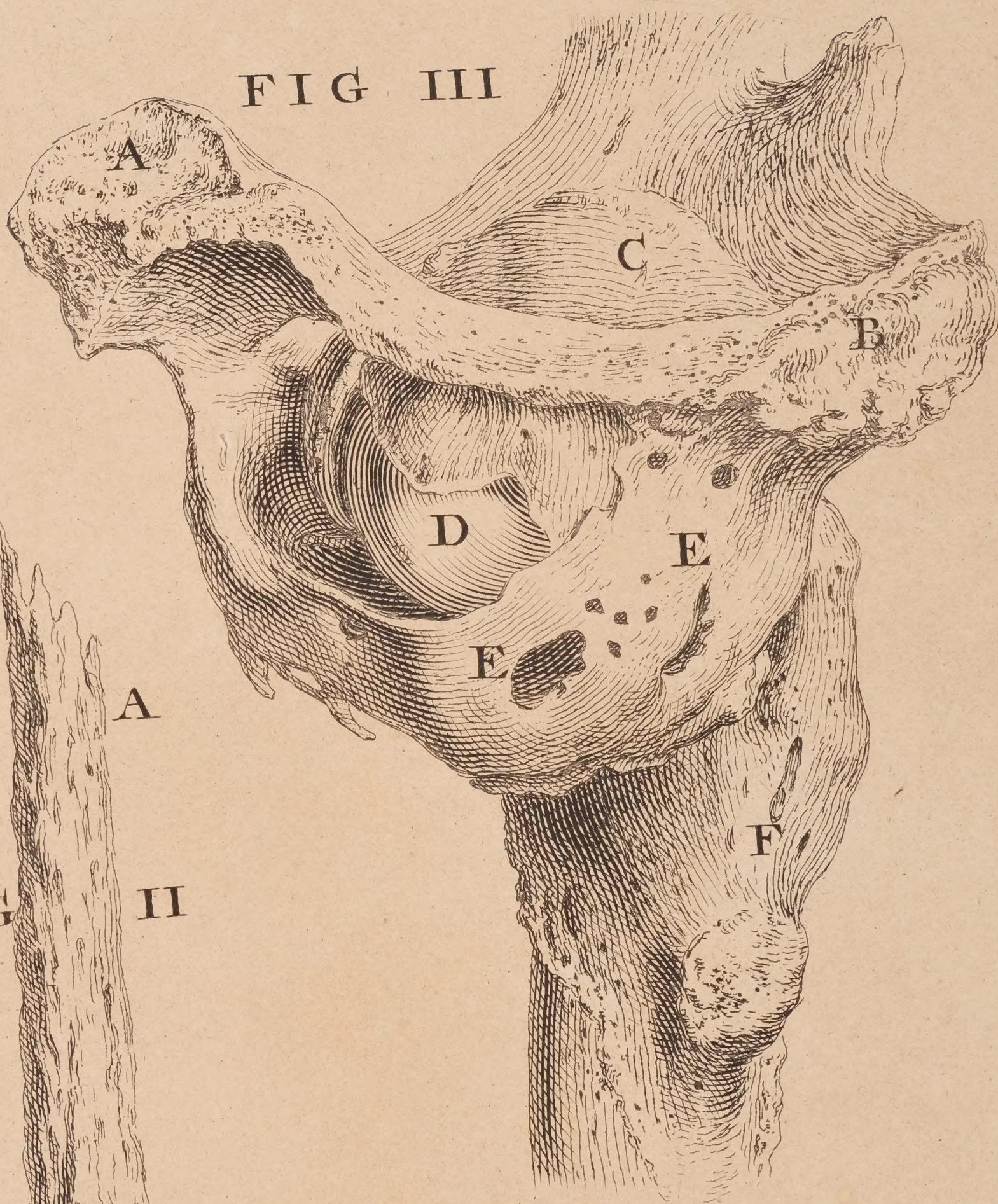
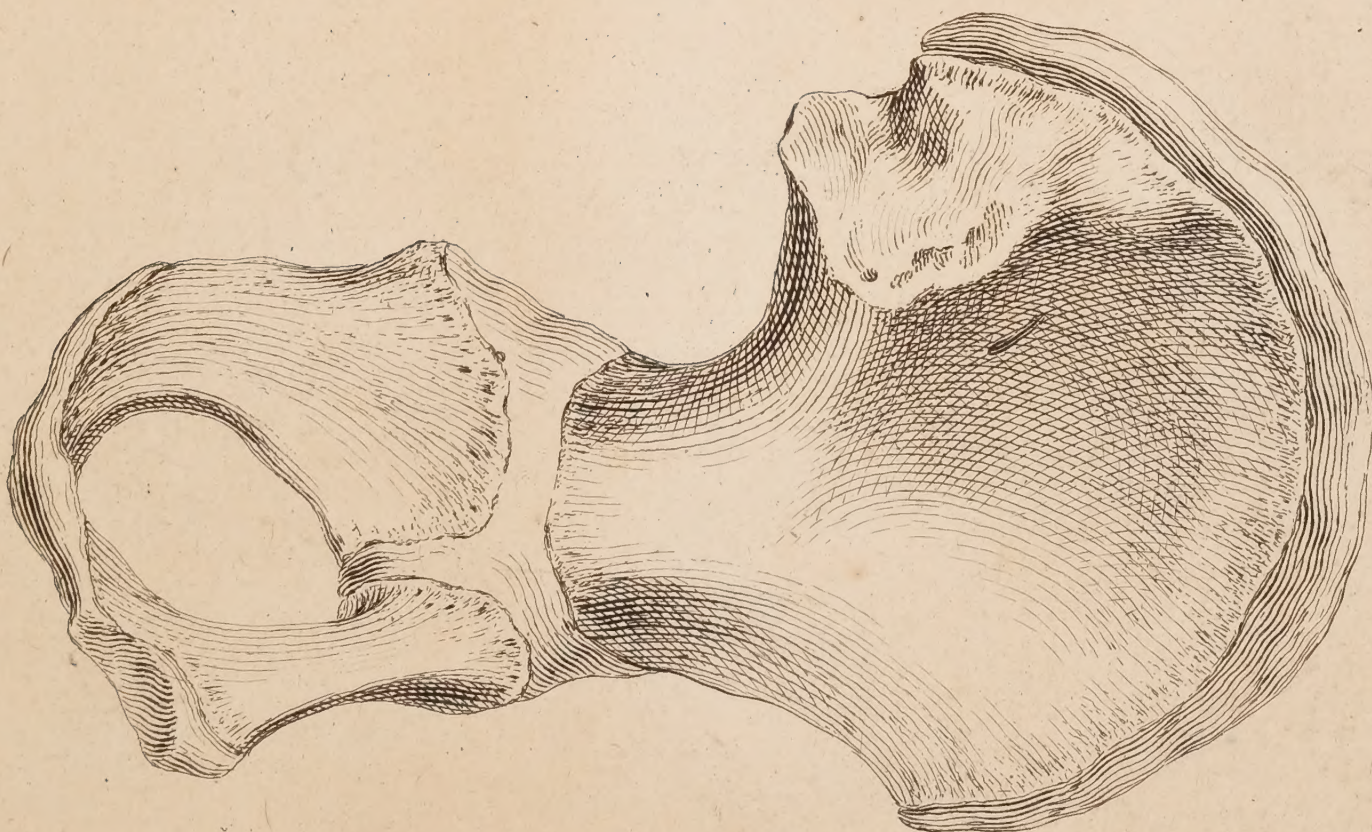
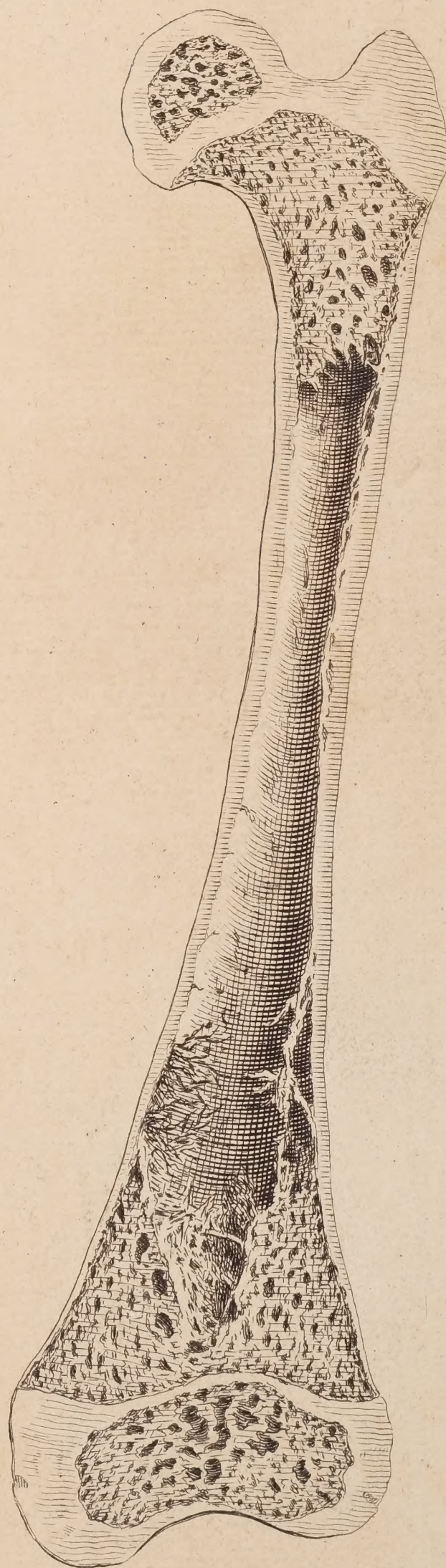
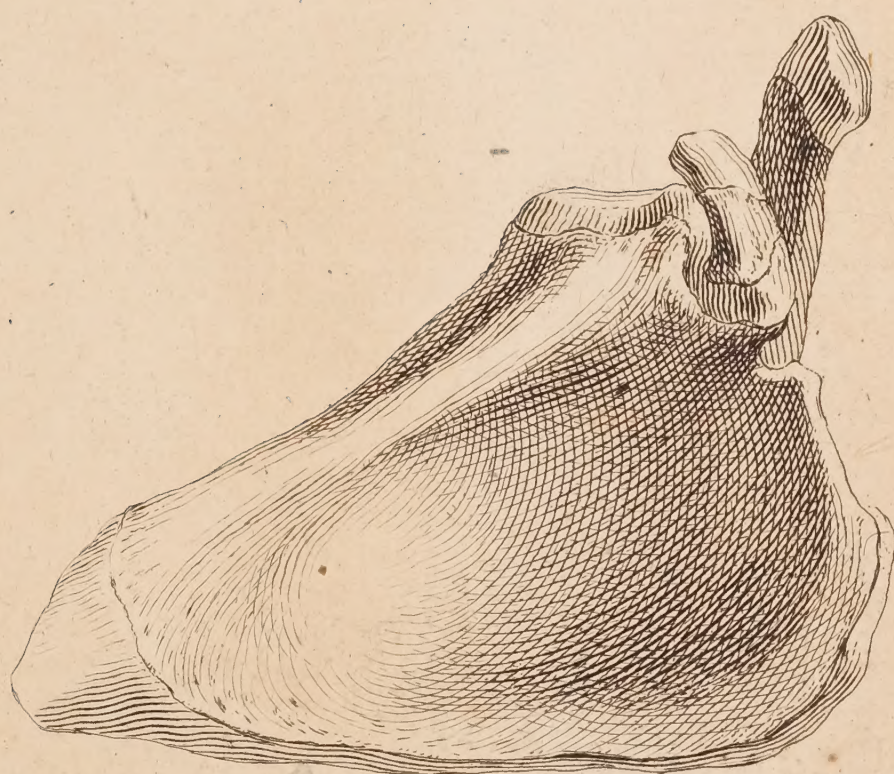
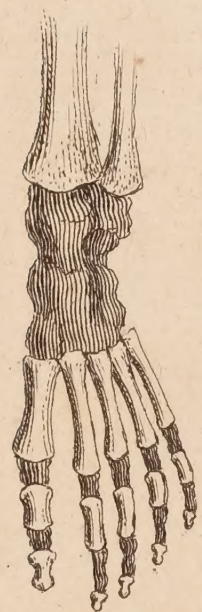
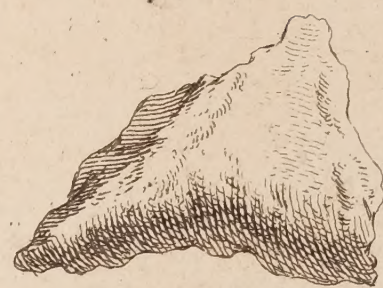
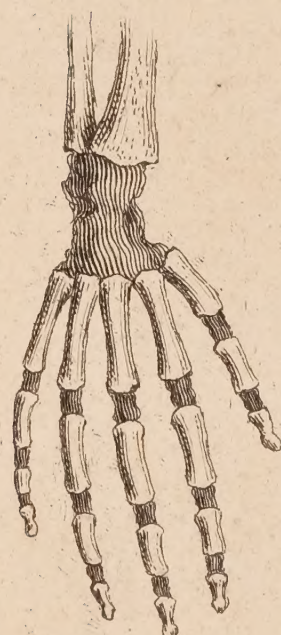
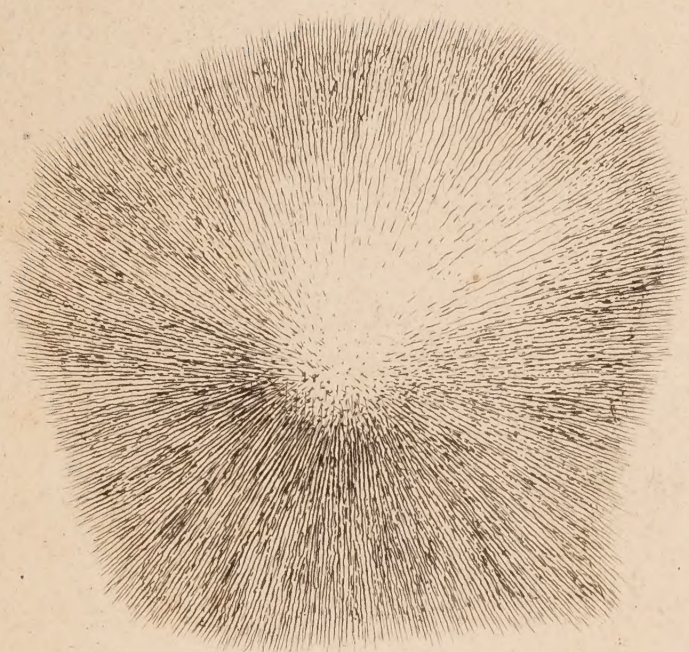
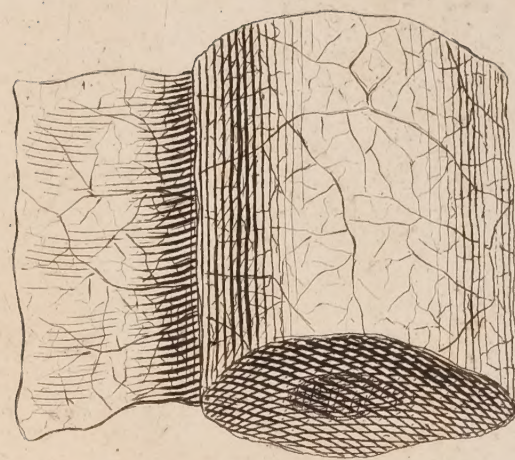
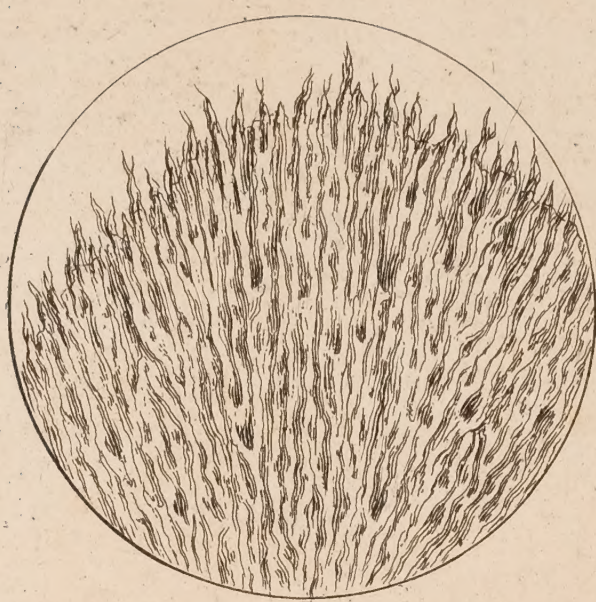


FIG IIII

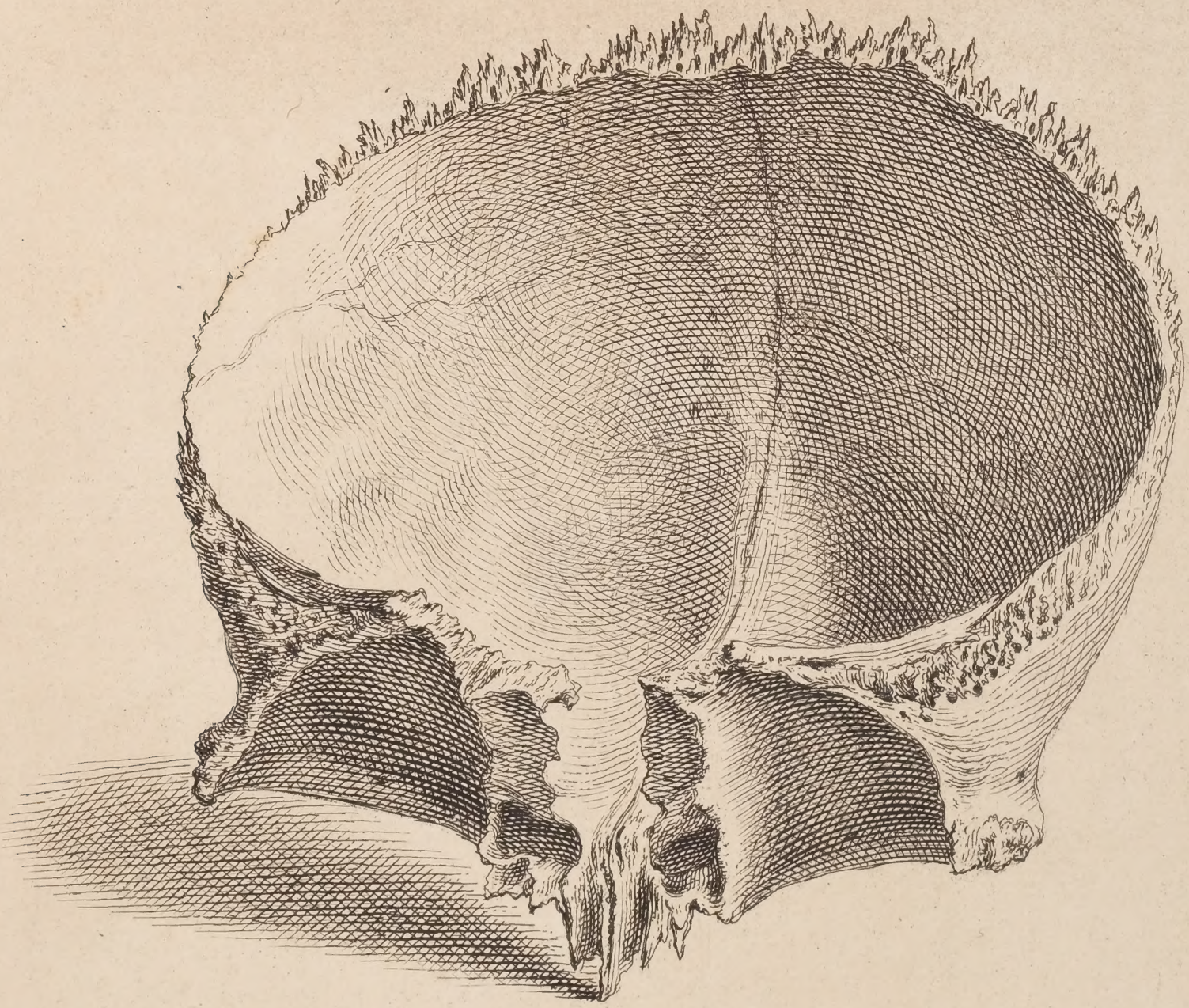
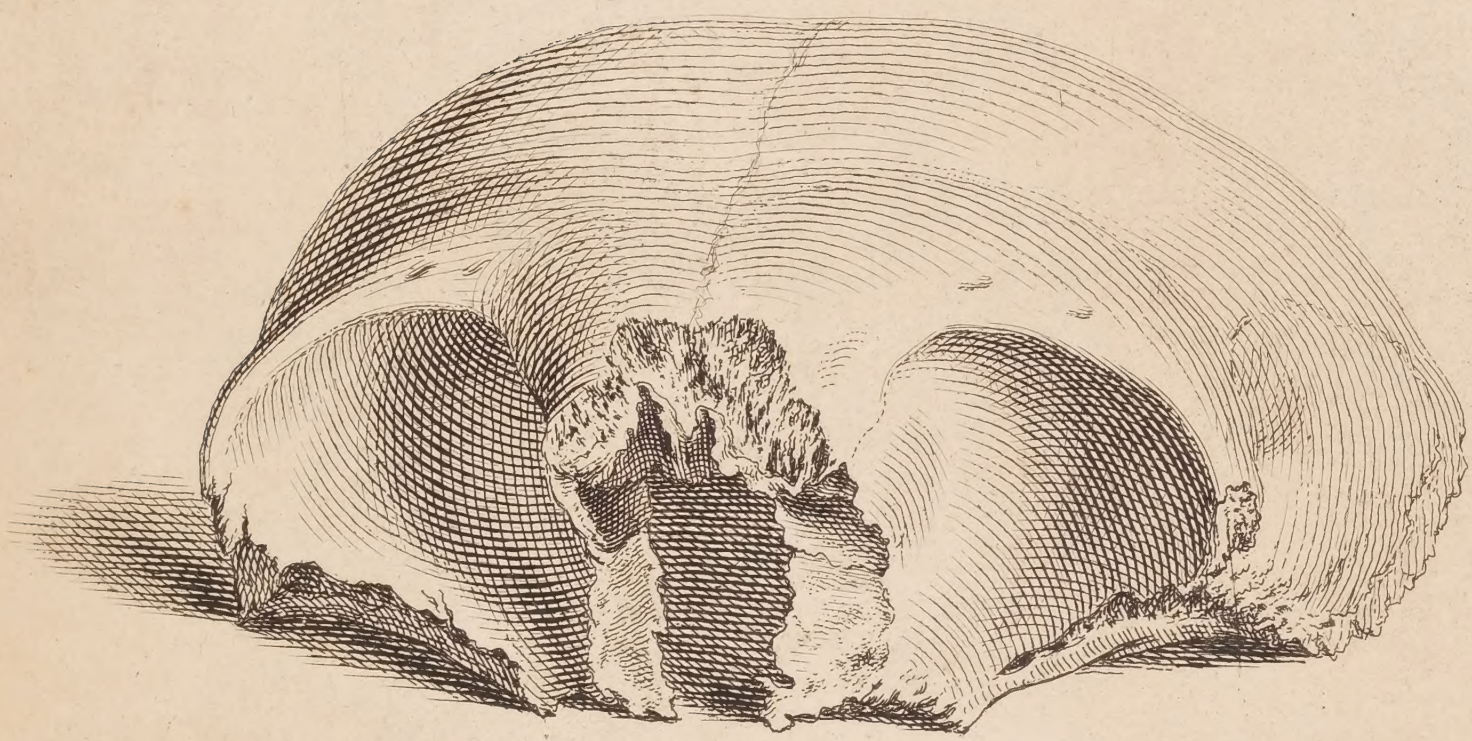
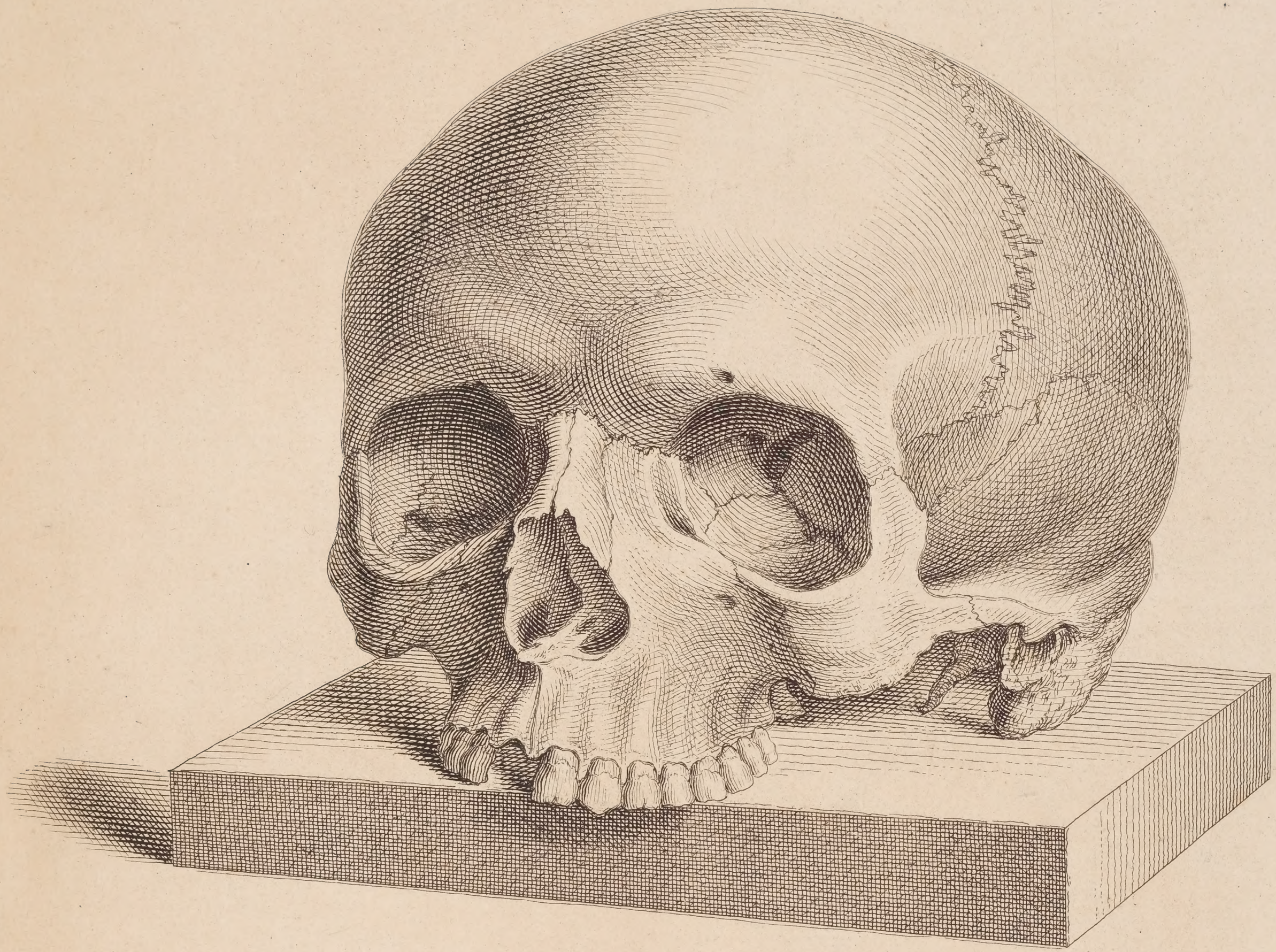


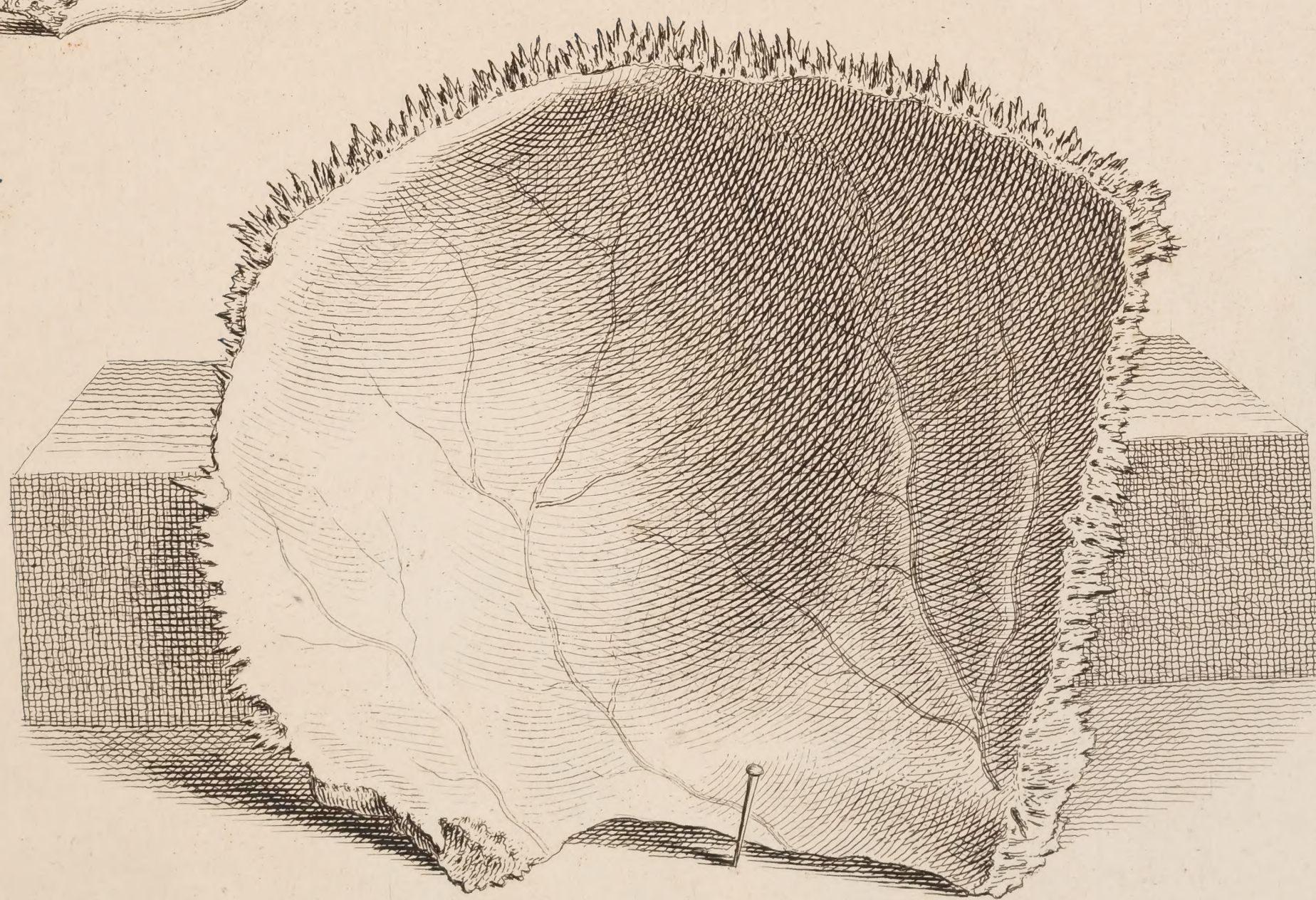
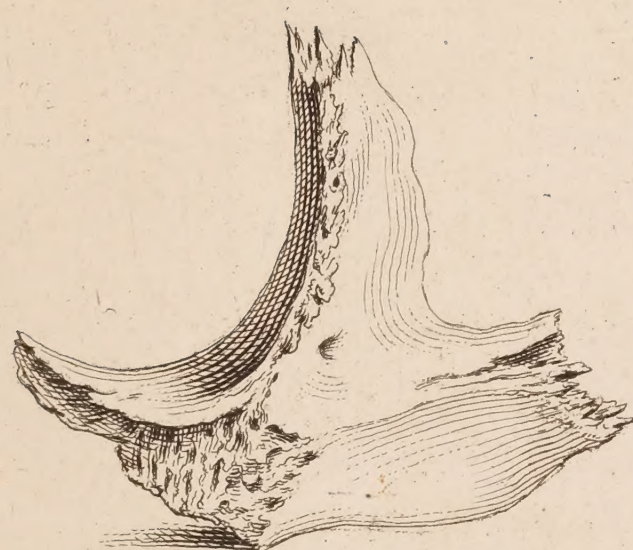
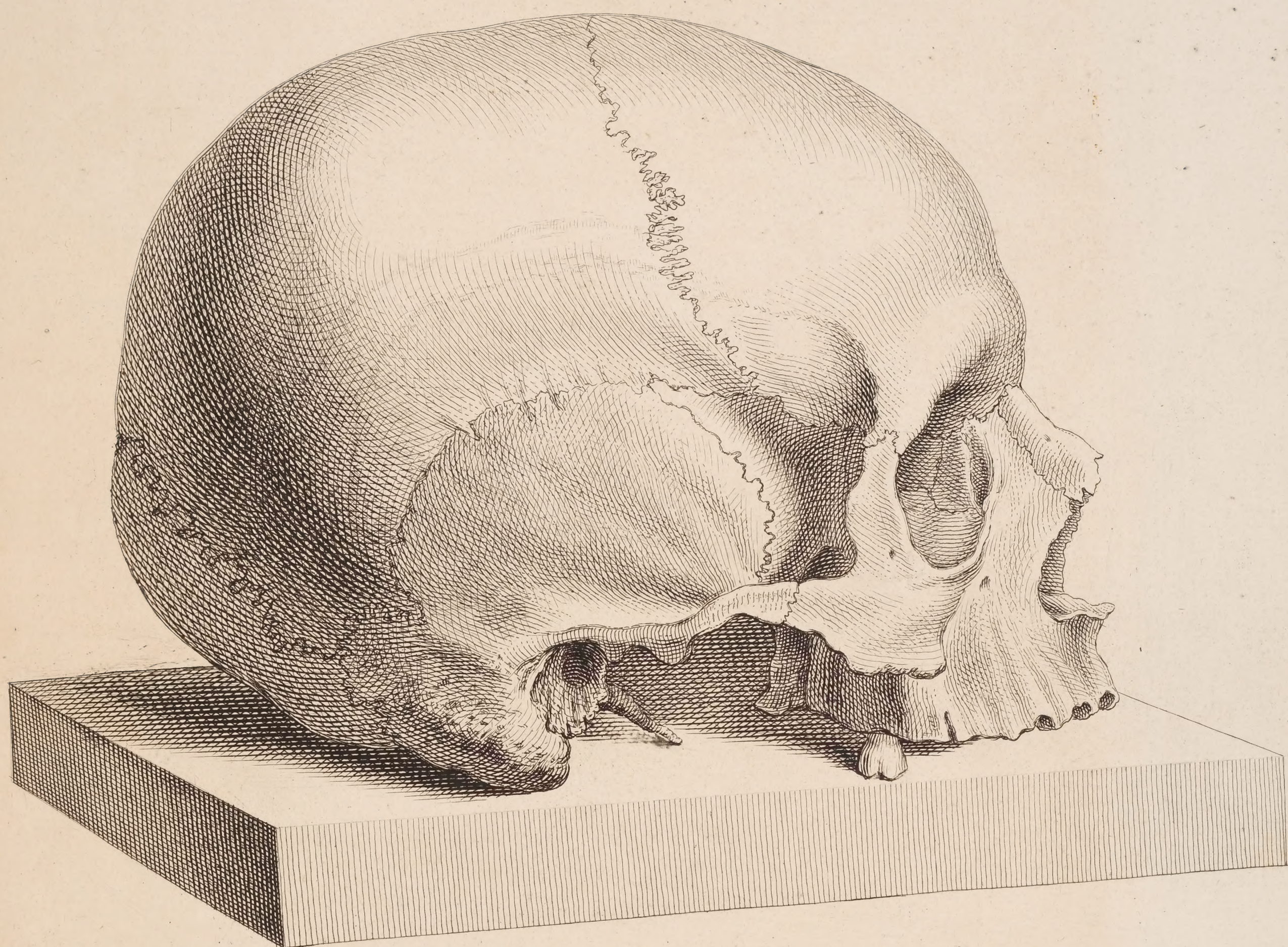
TABLE LVI.

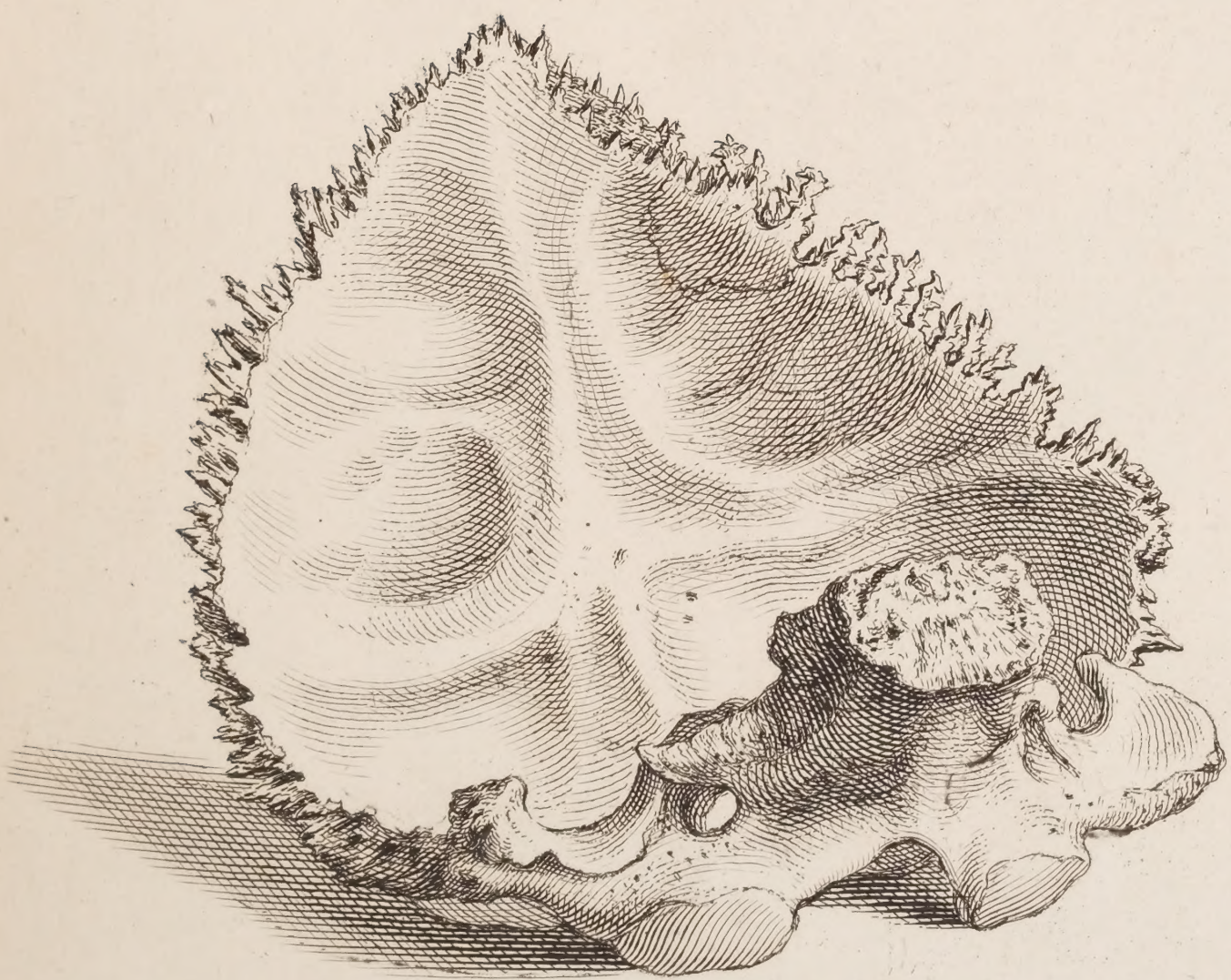
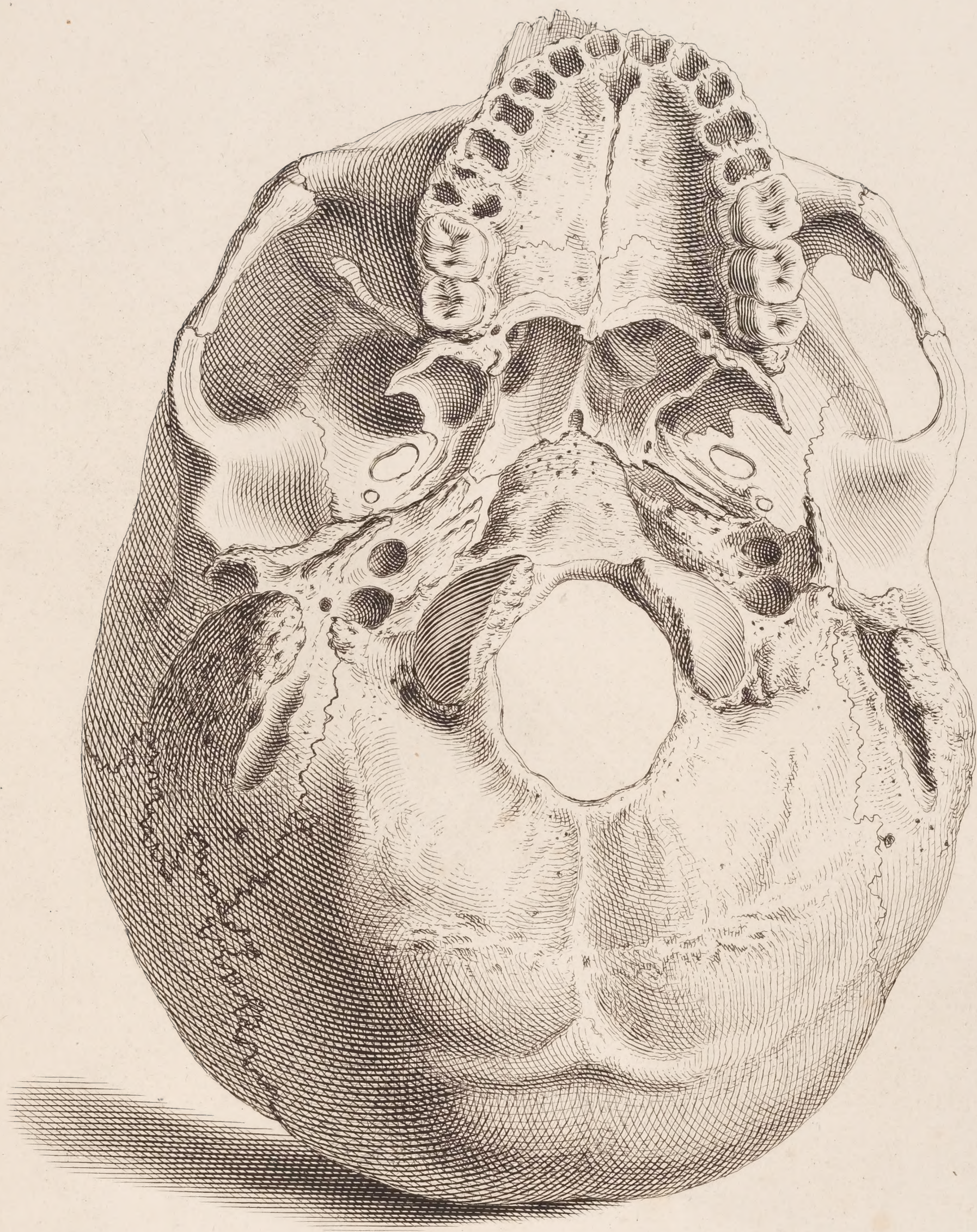
A BONY chalky foetus which was said to have lain in utero (I suppose in the fallopian tube) twenty six years: Communicated to me by Monsieur *Arneau* owner of the french anatomy waxwork.

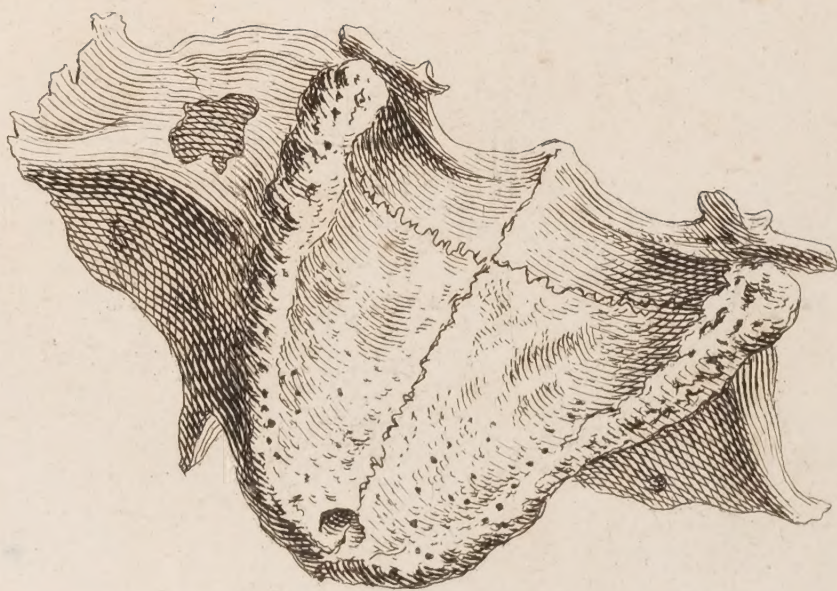
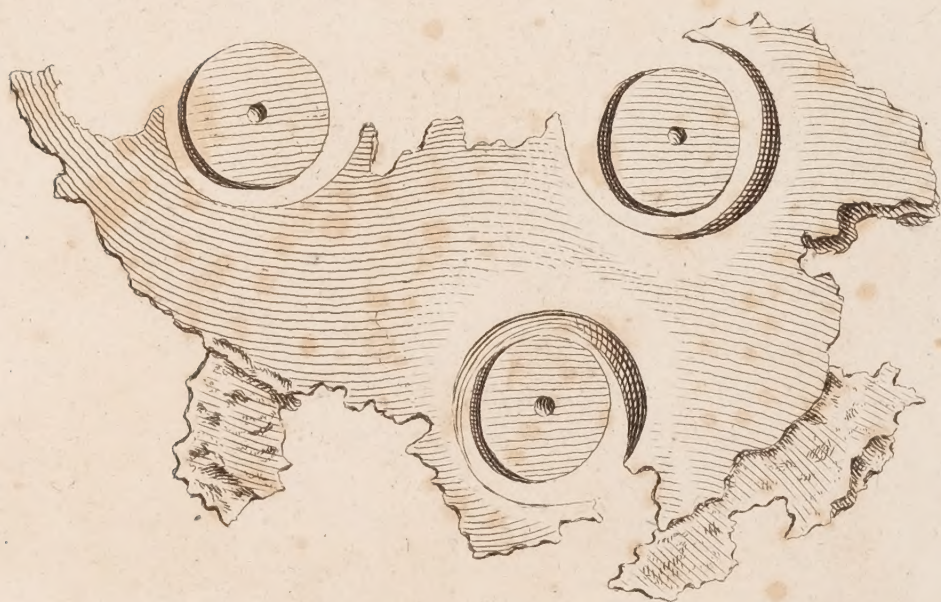
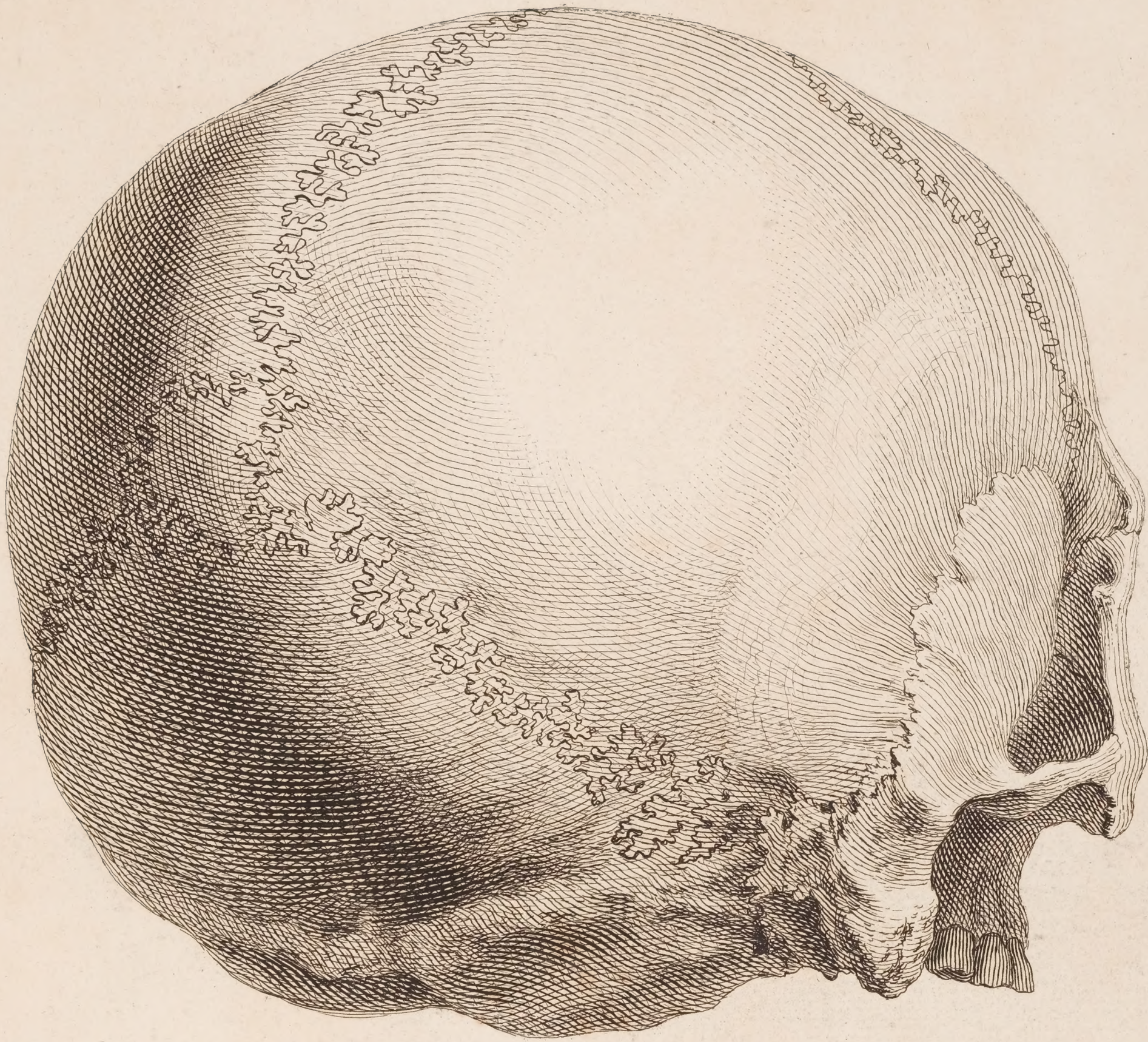




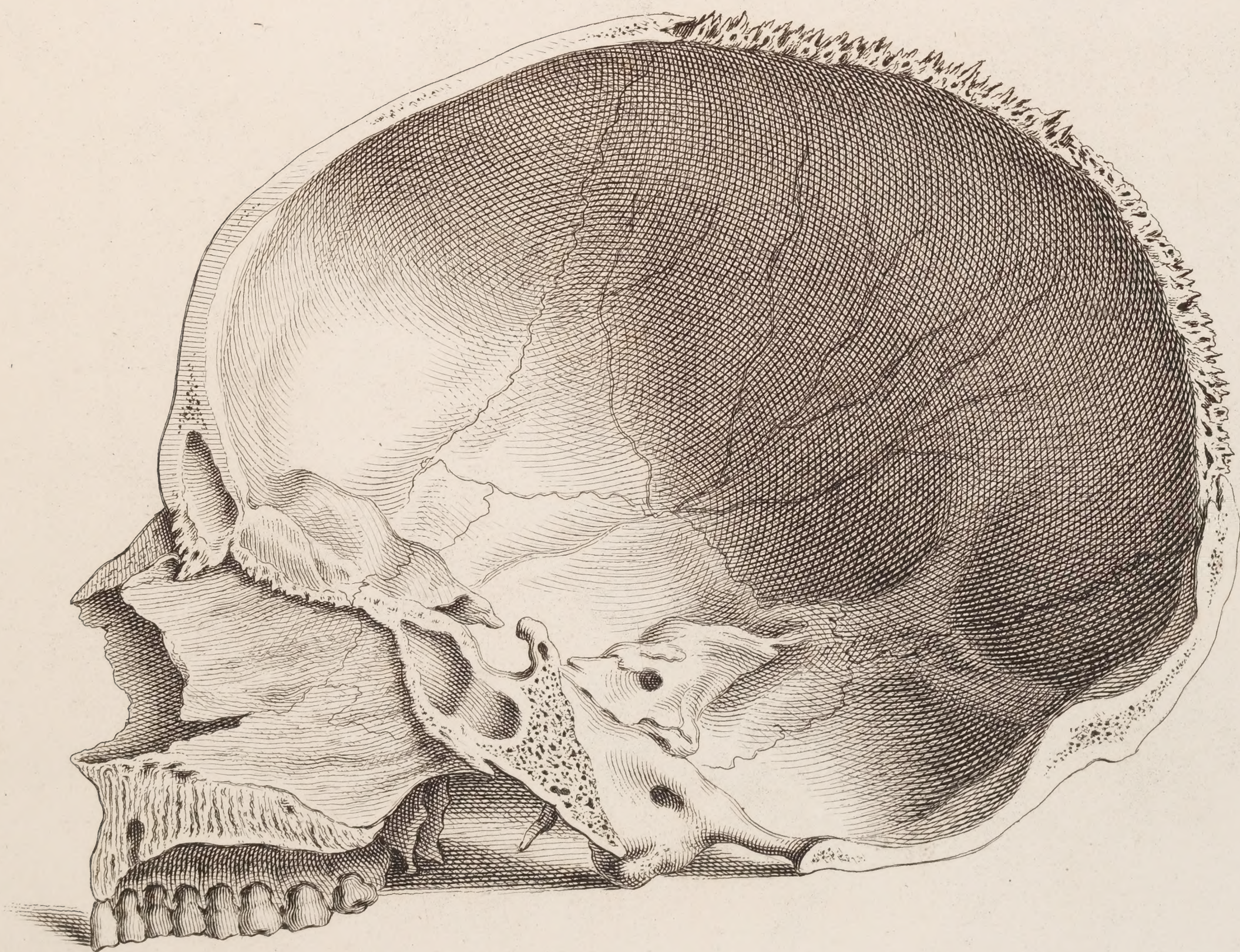
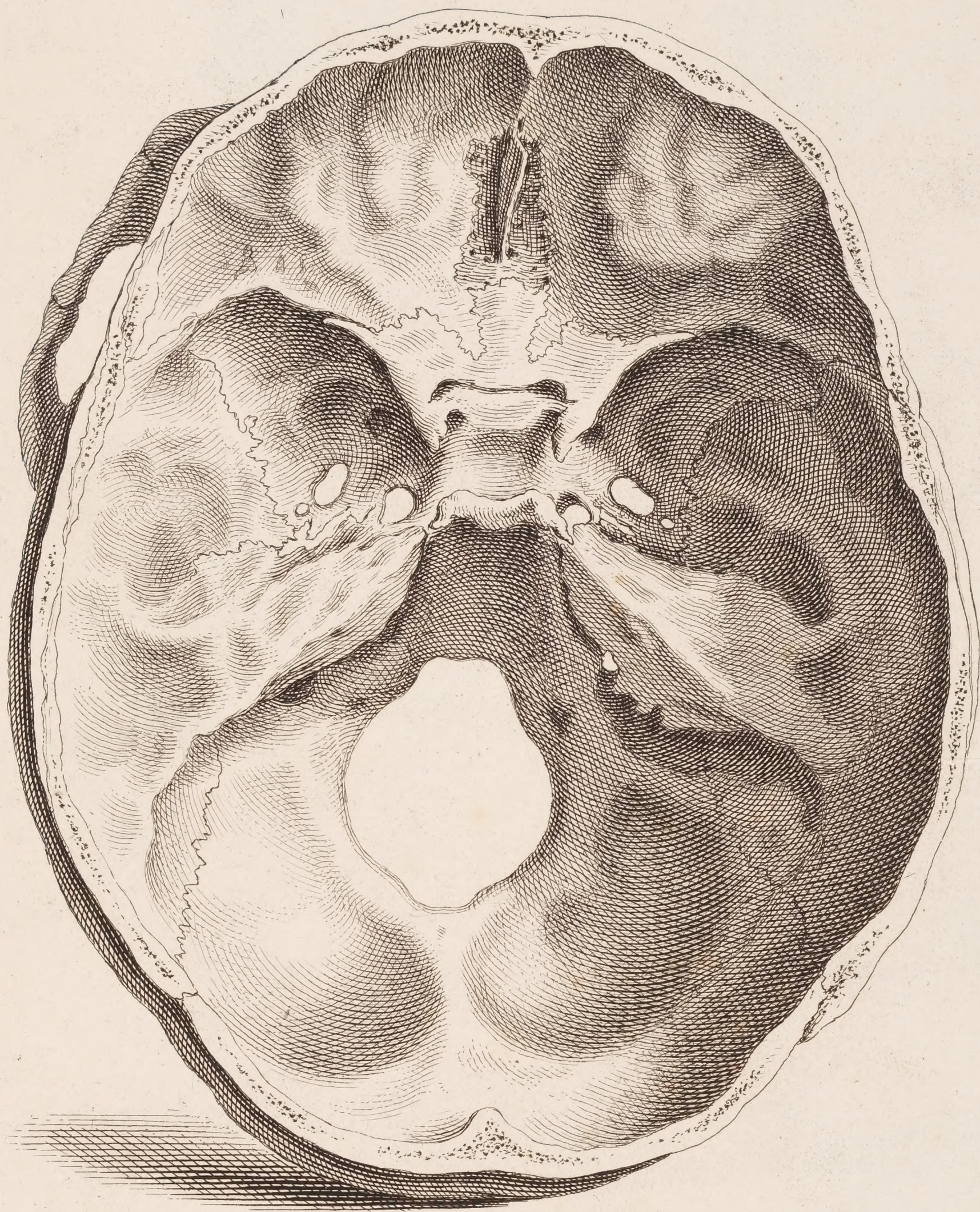




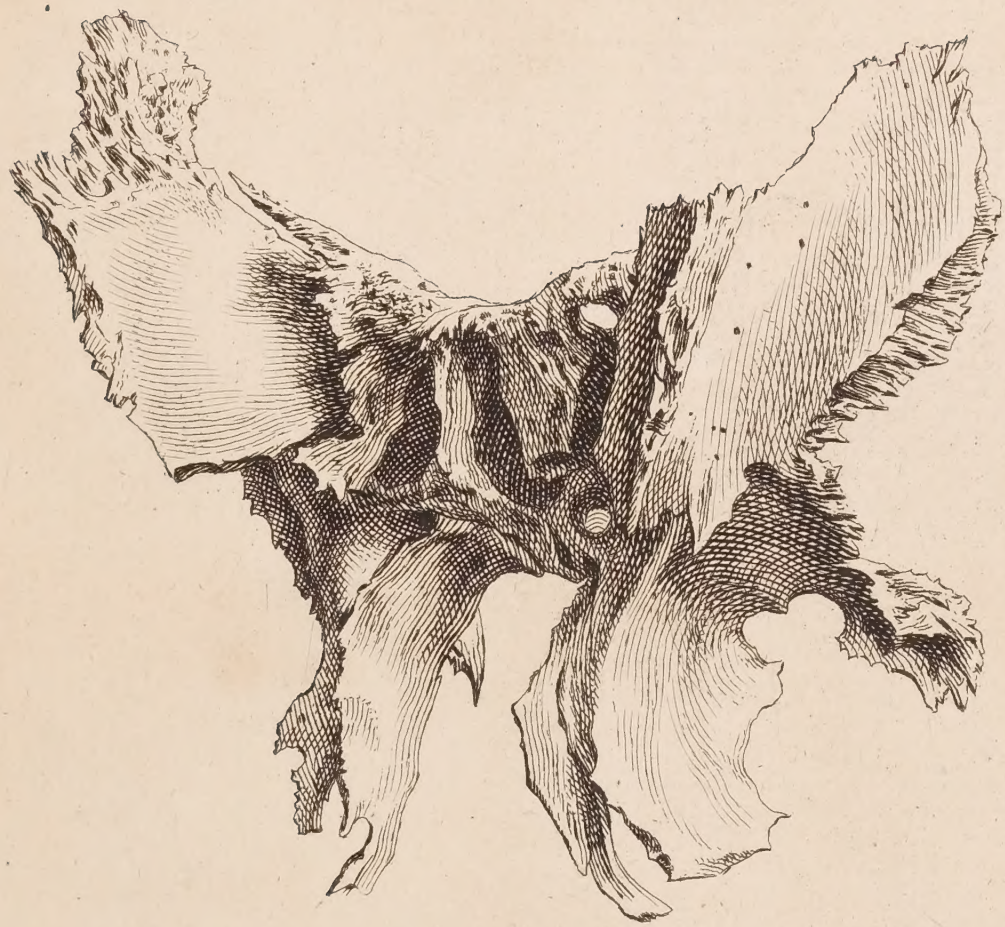
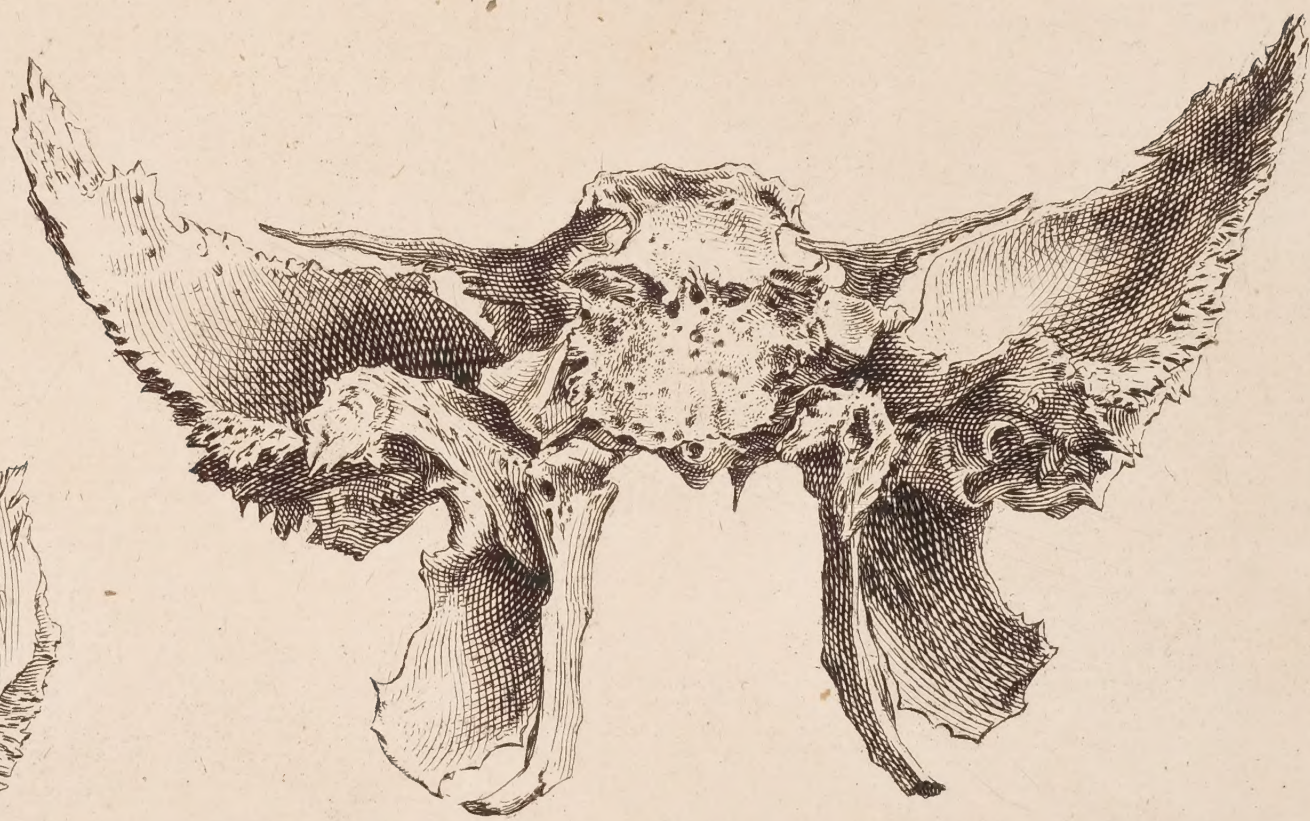
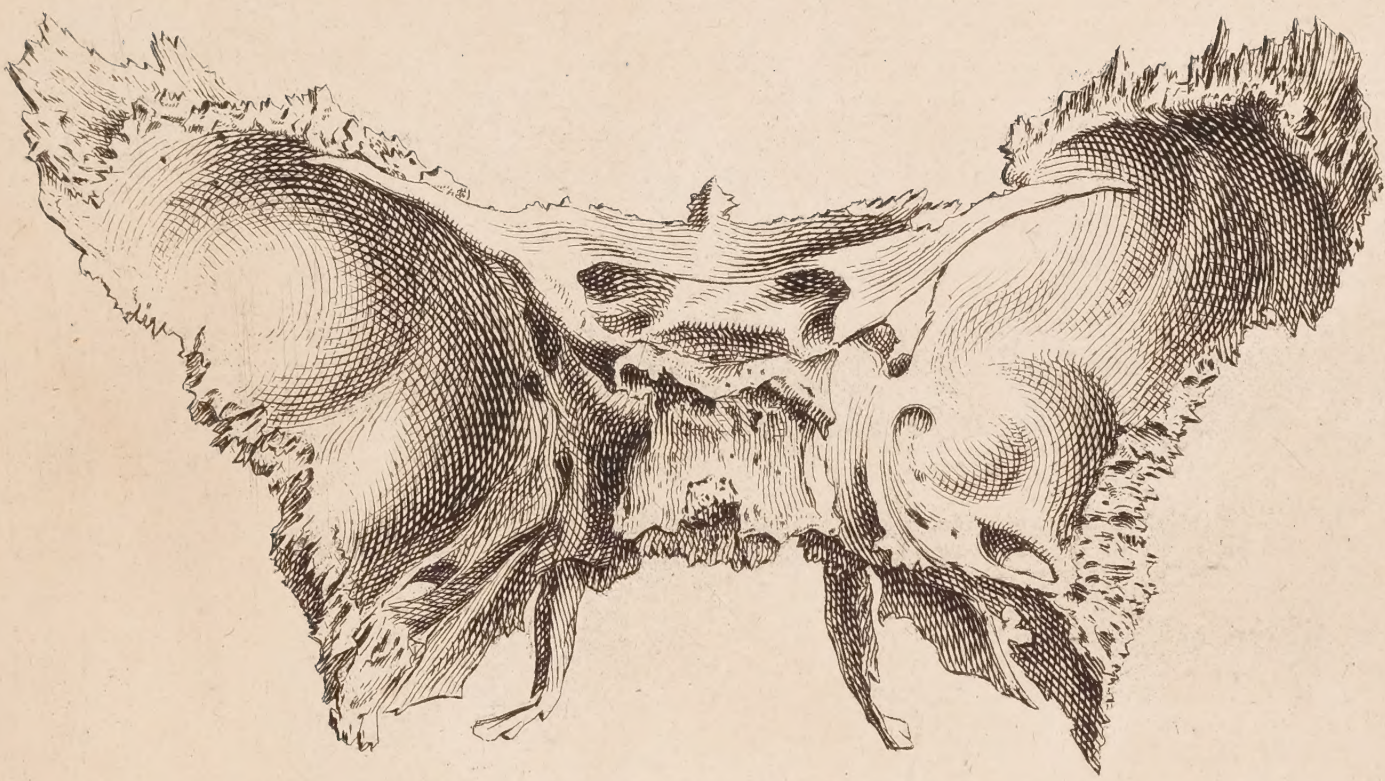


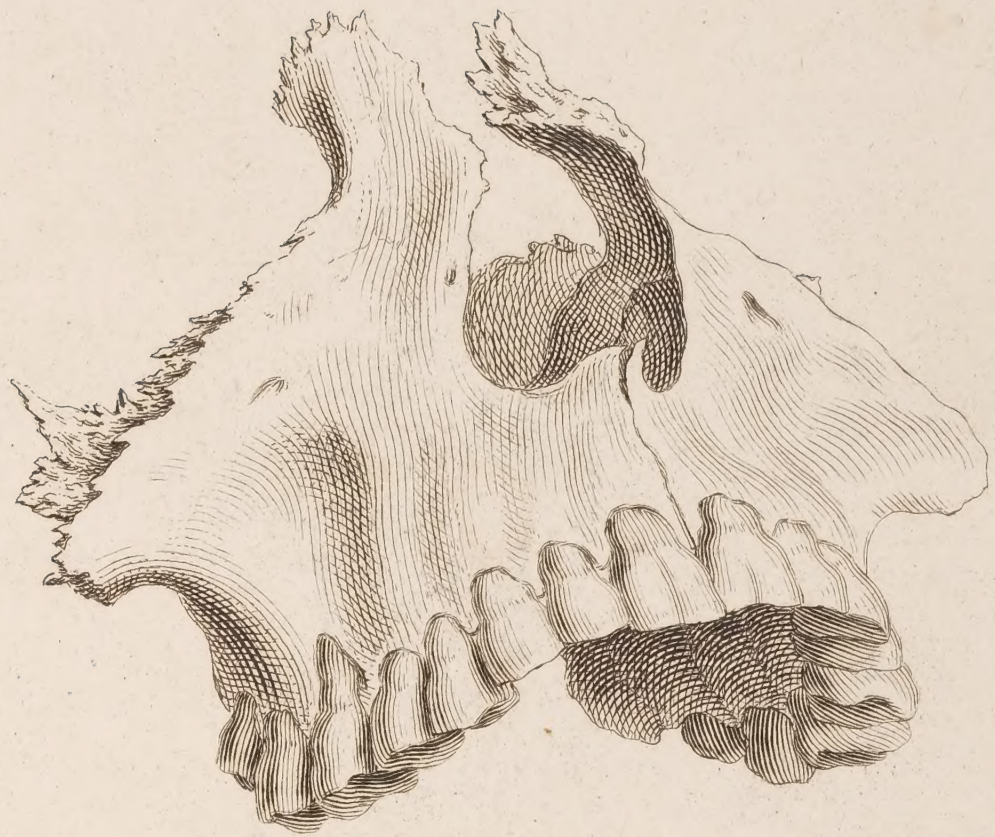


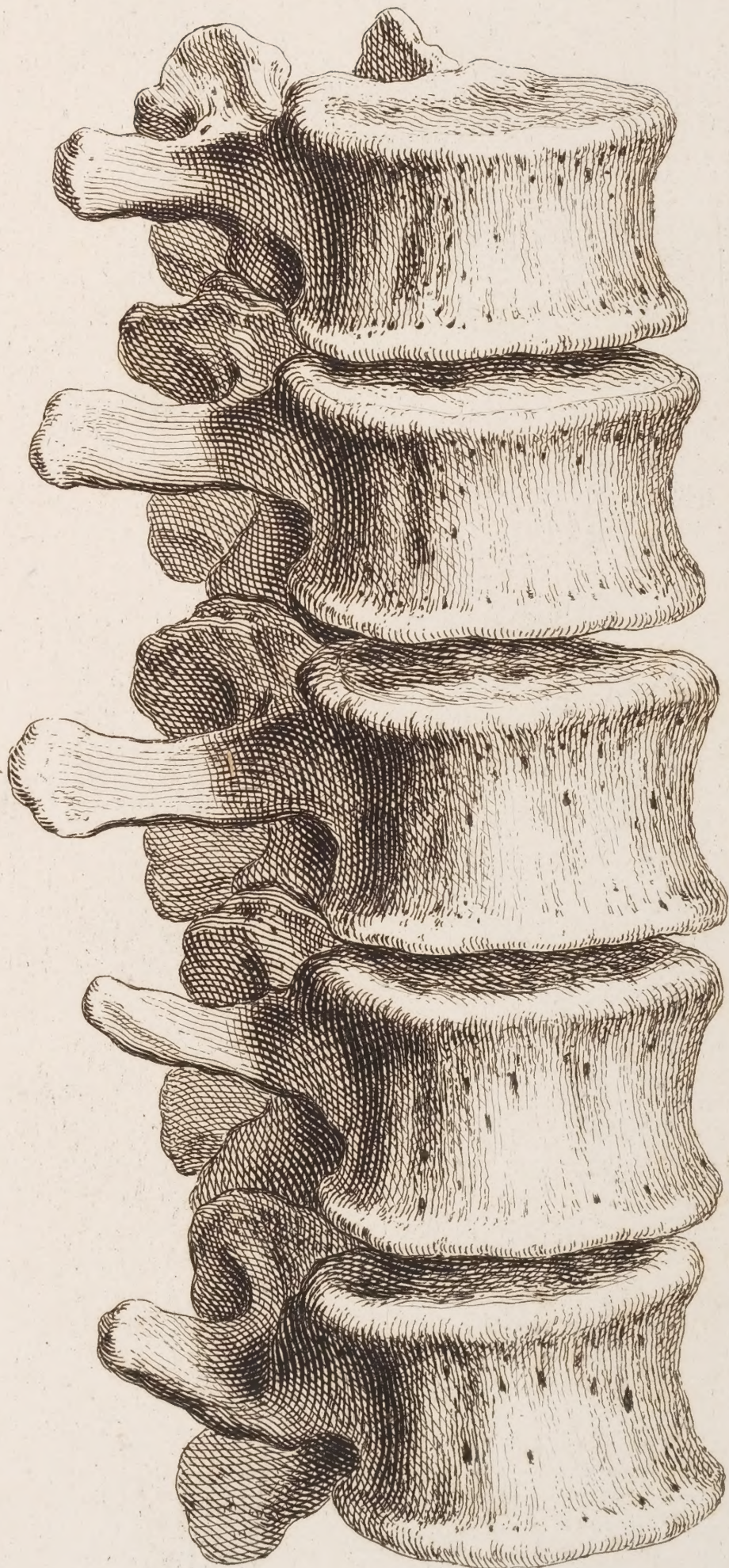
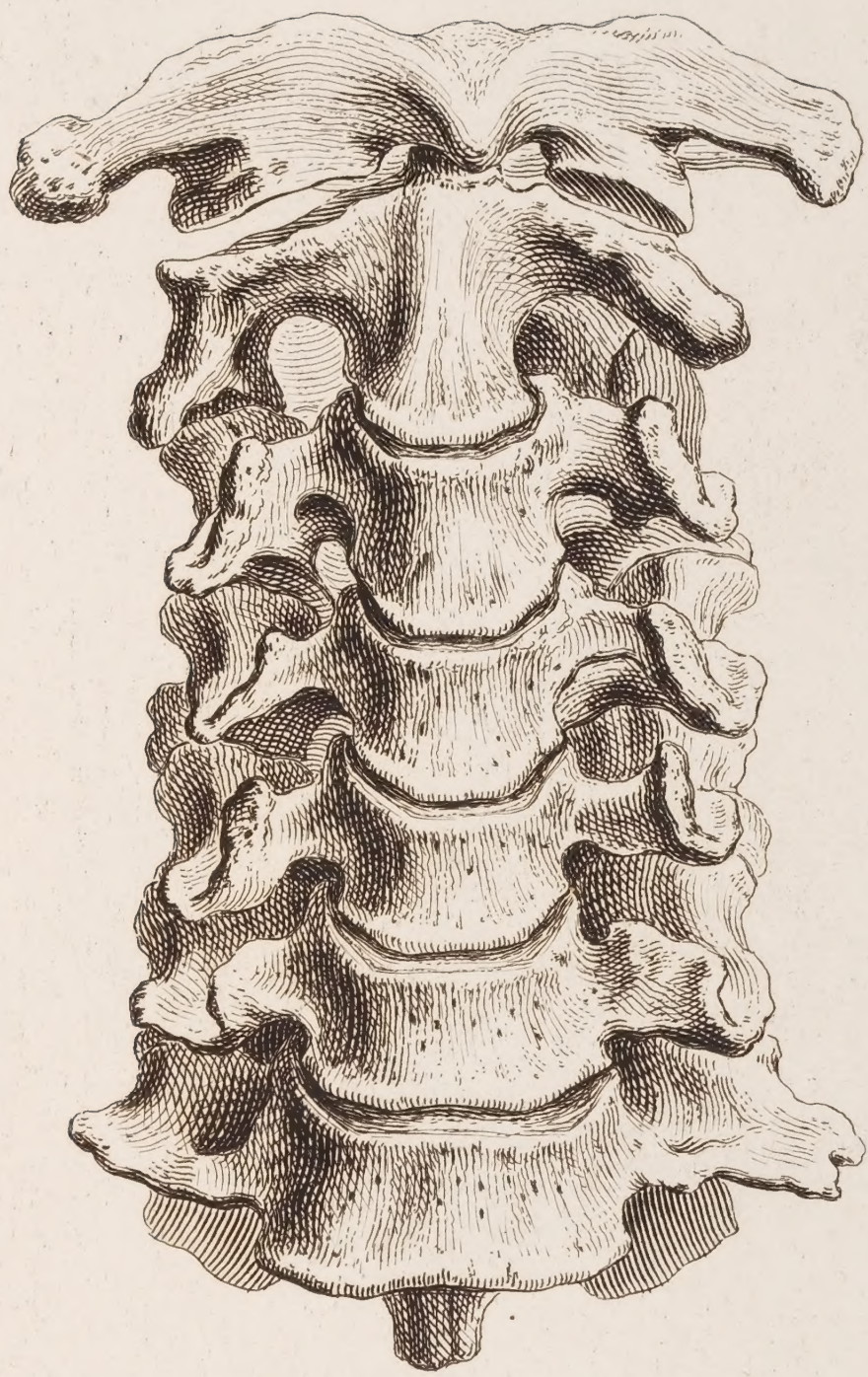
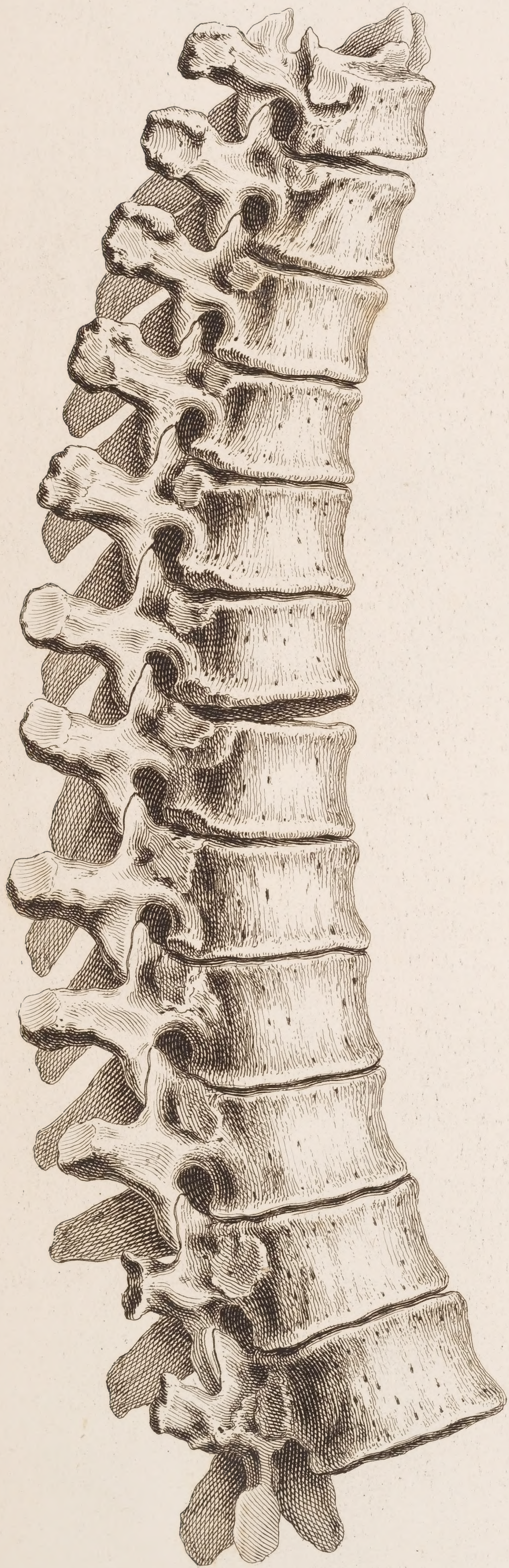
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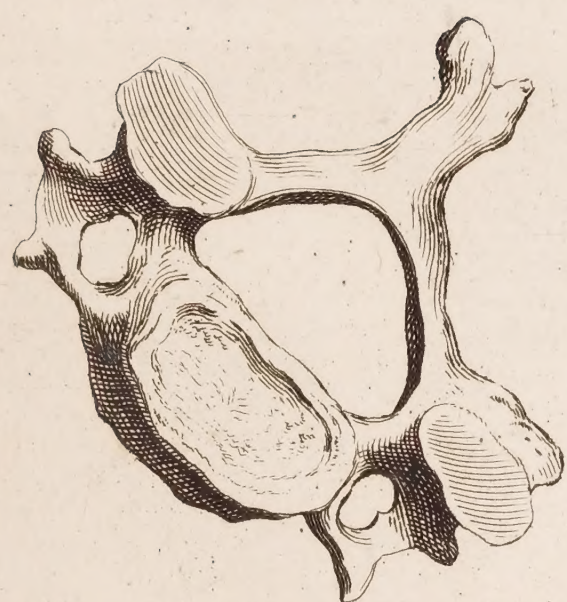
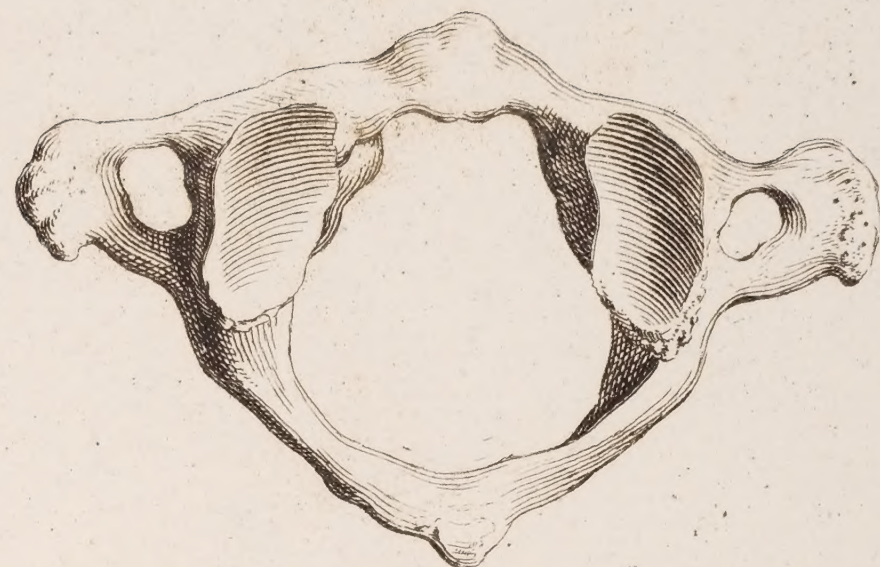
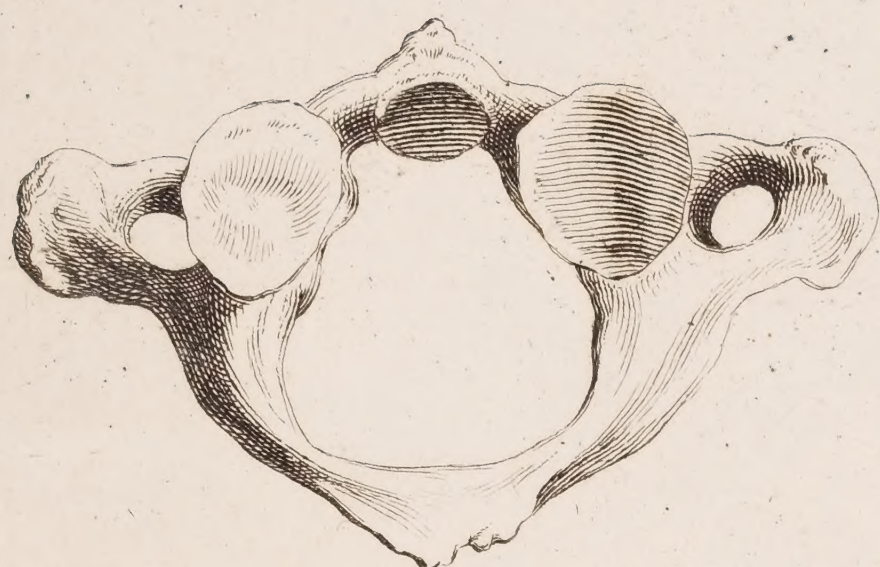


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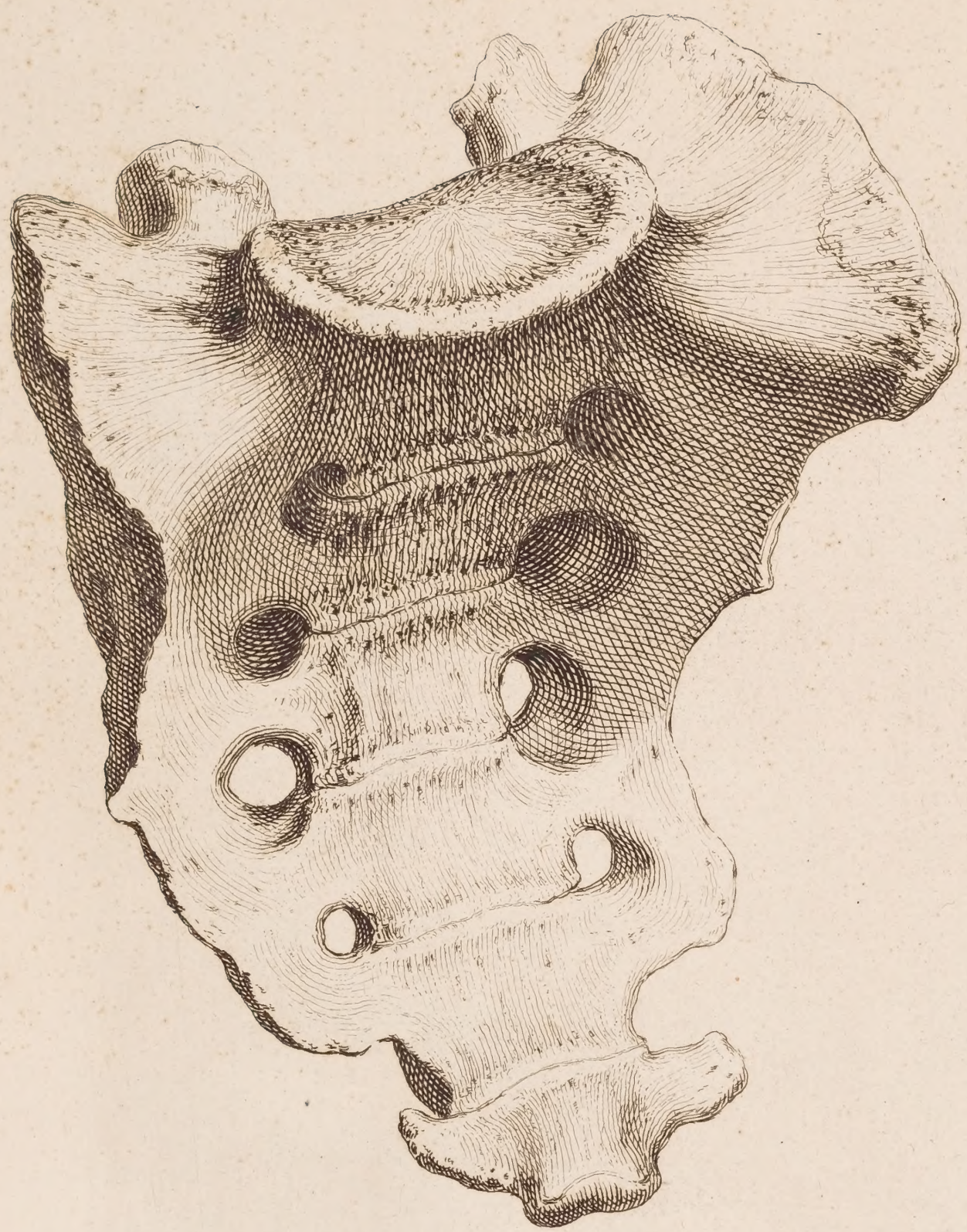


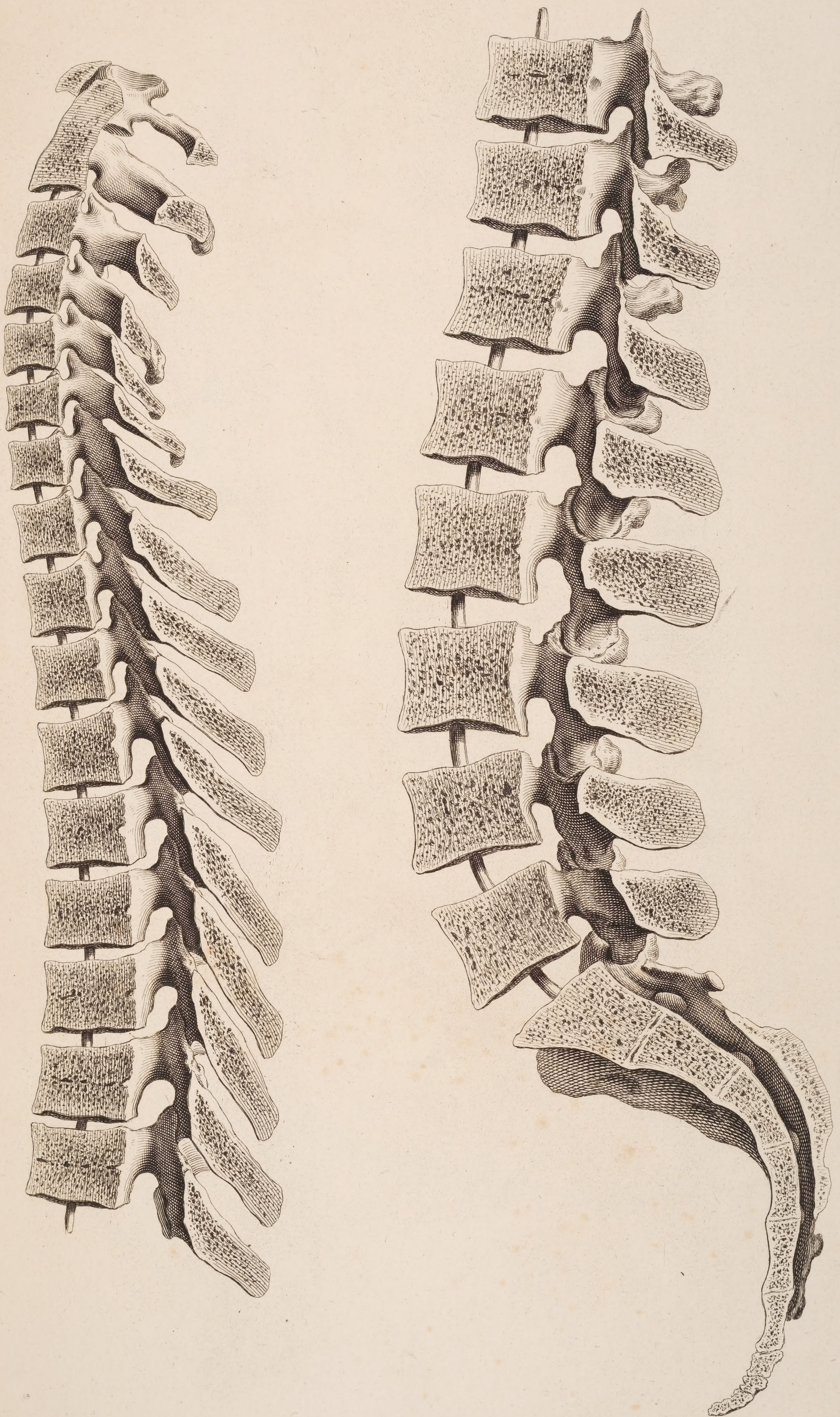










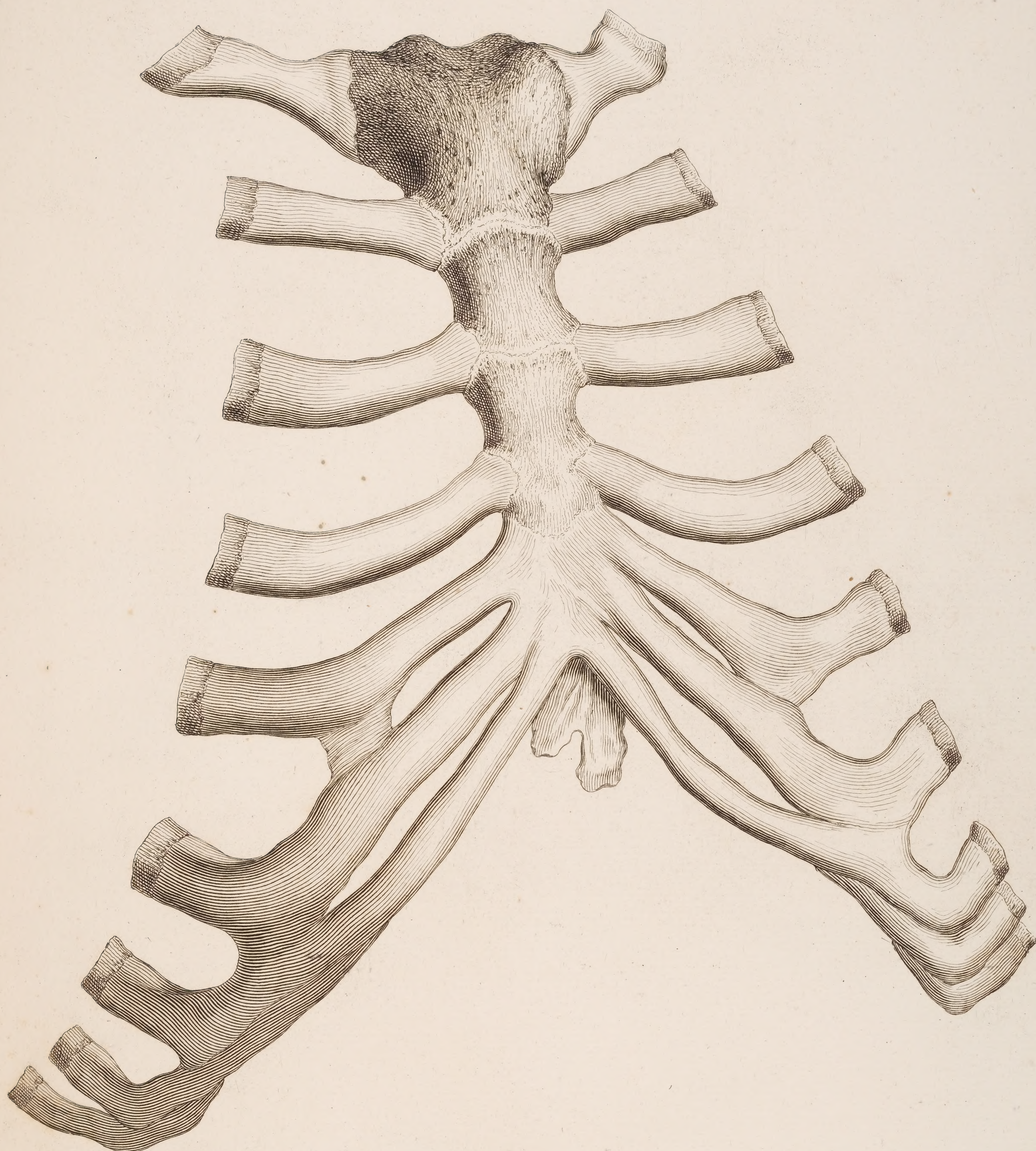


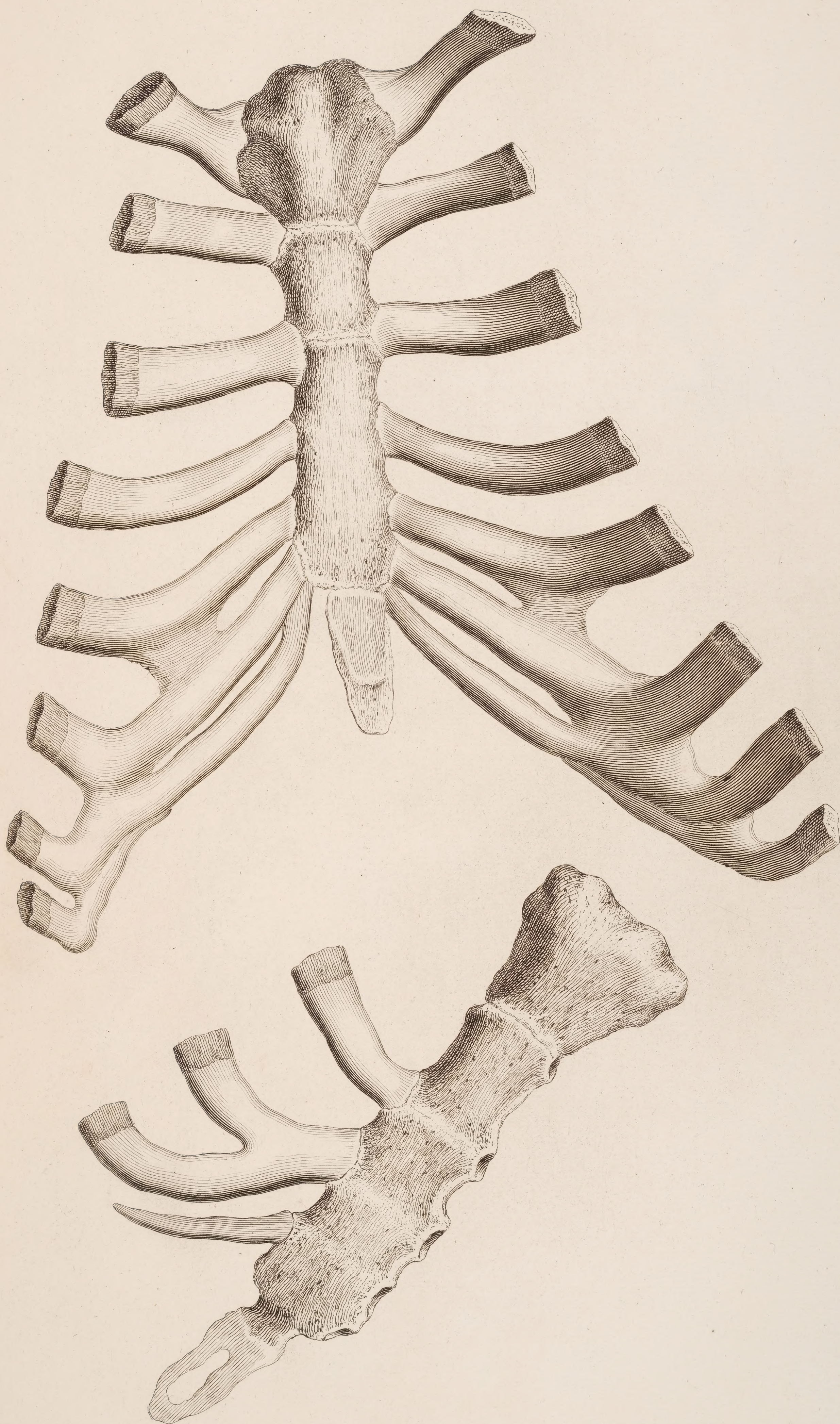
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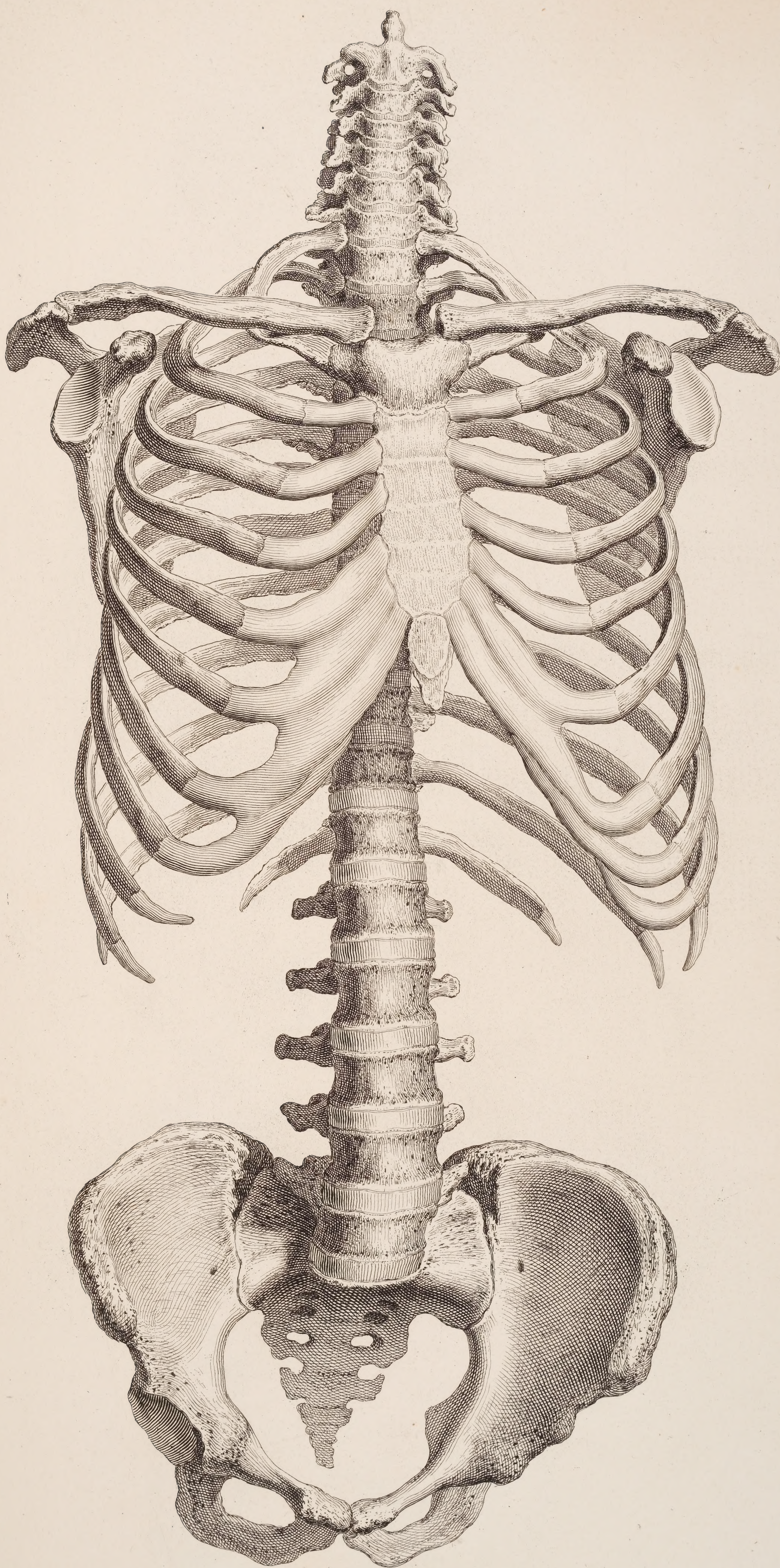


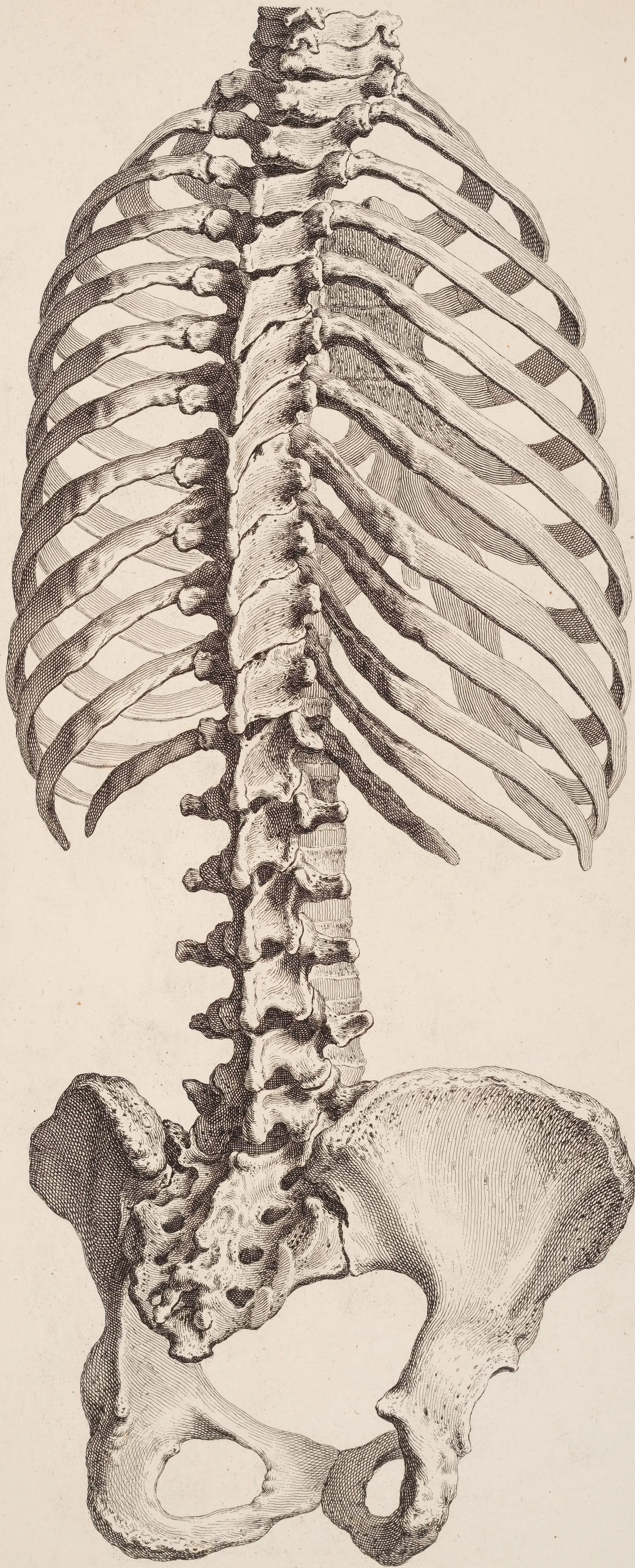


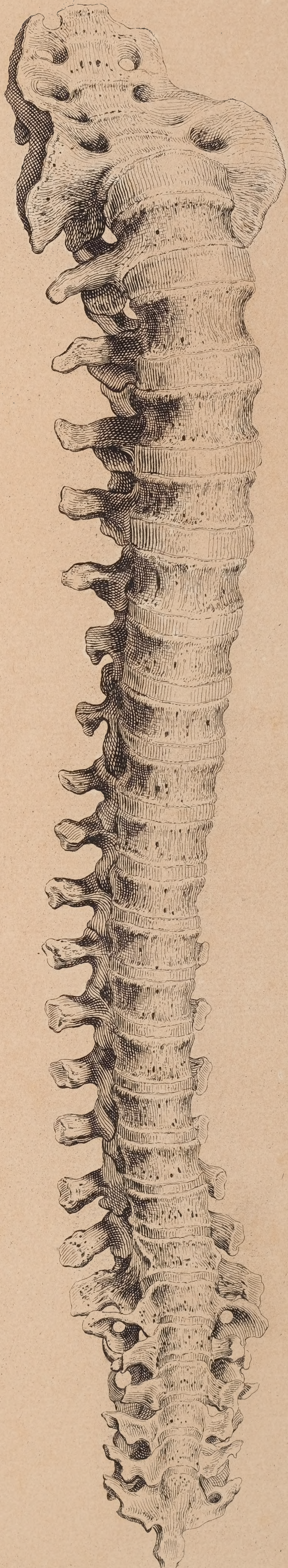


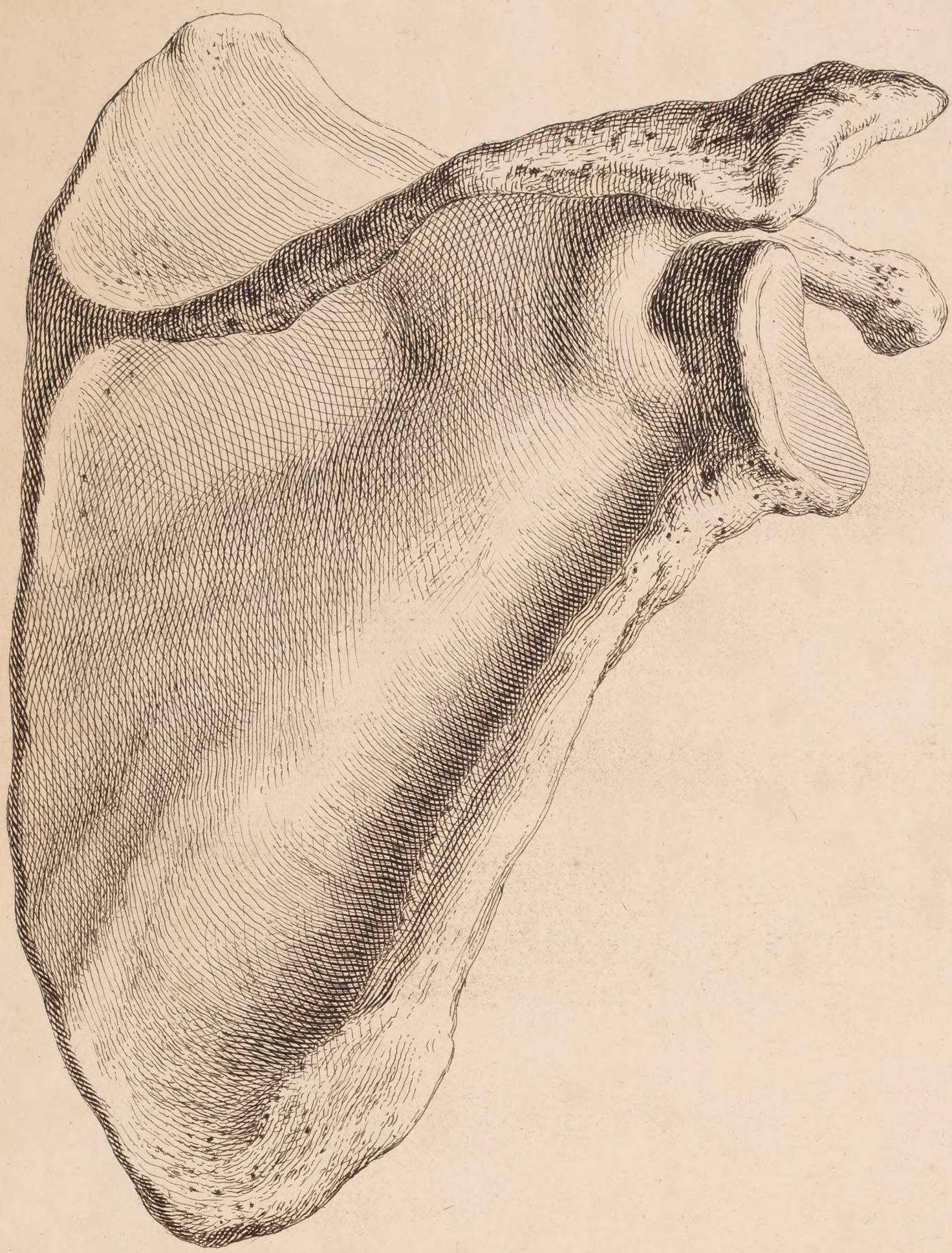


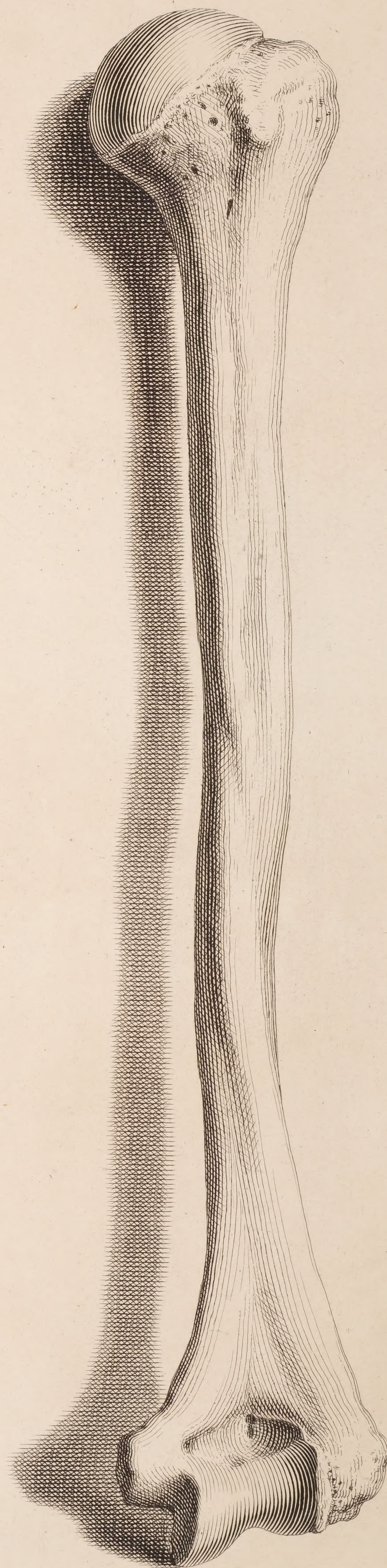
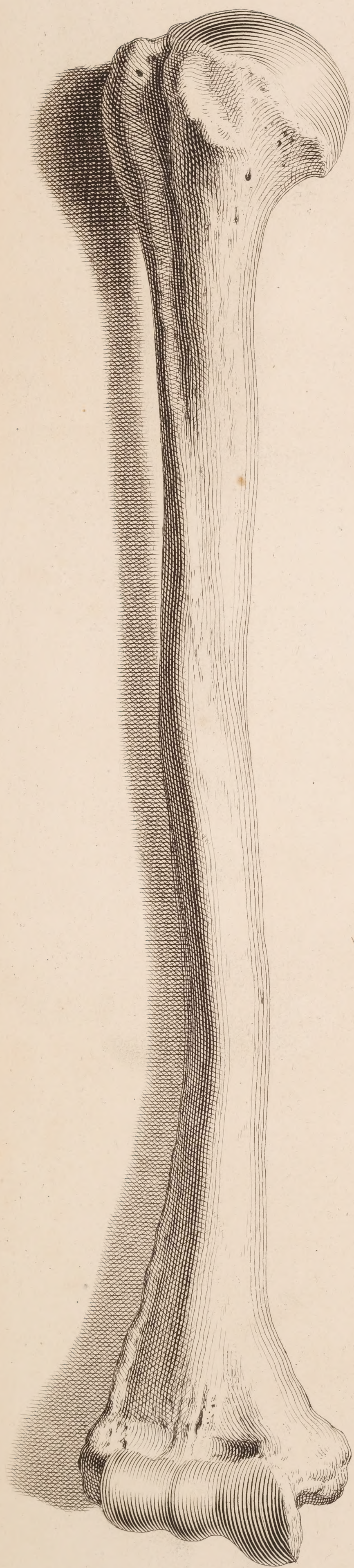
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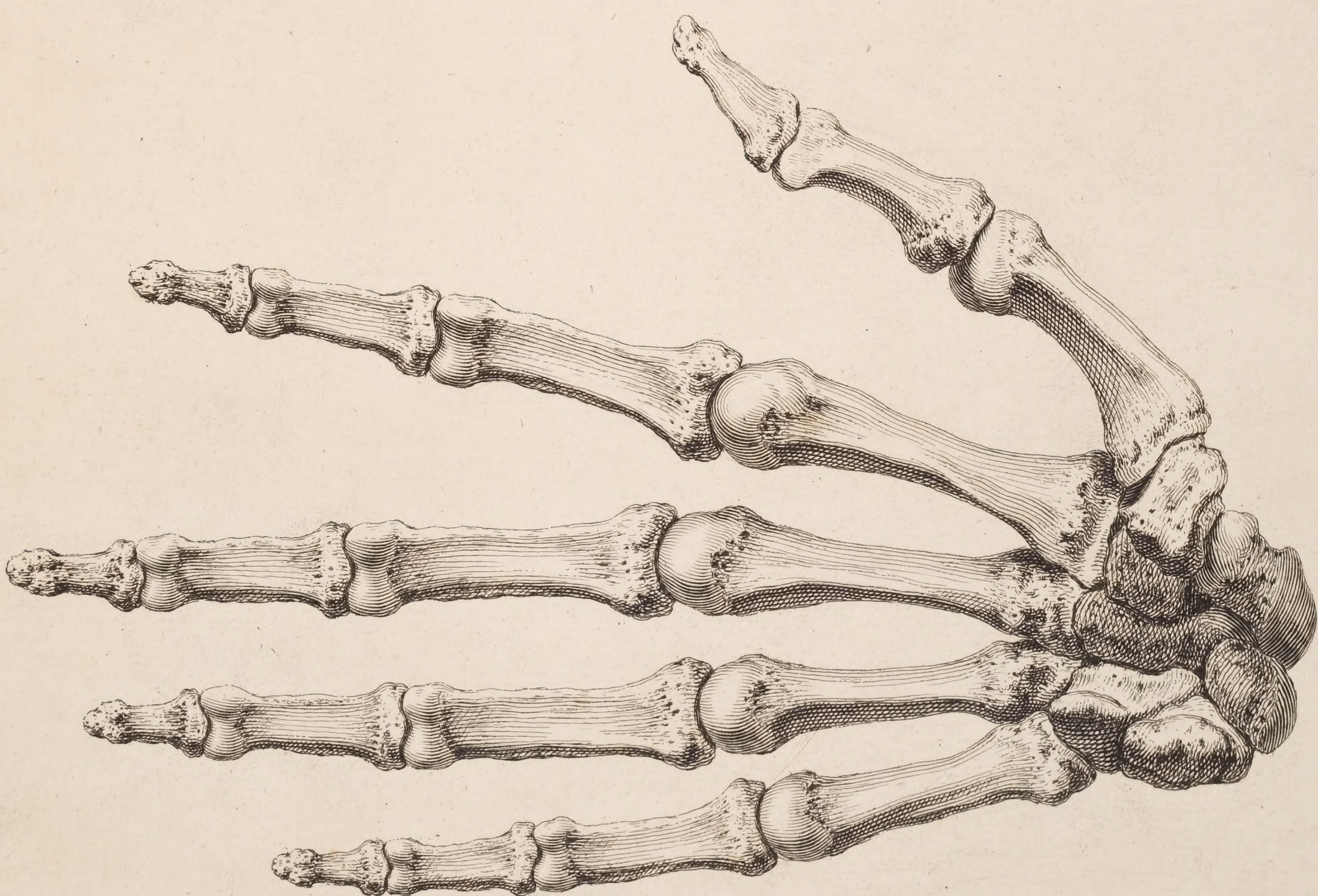
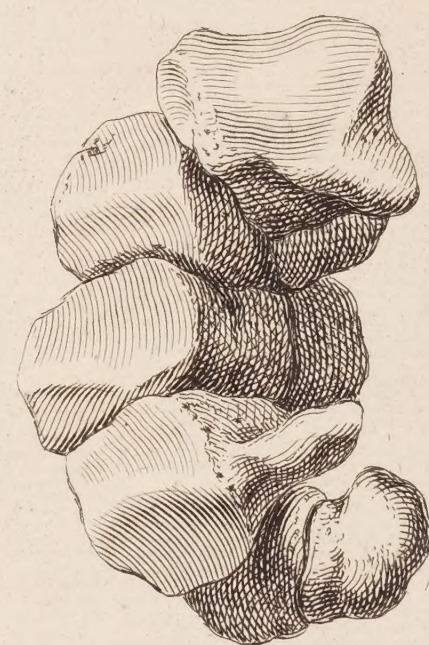
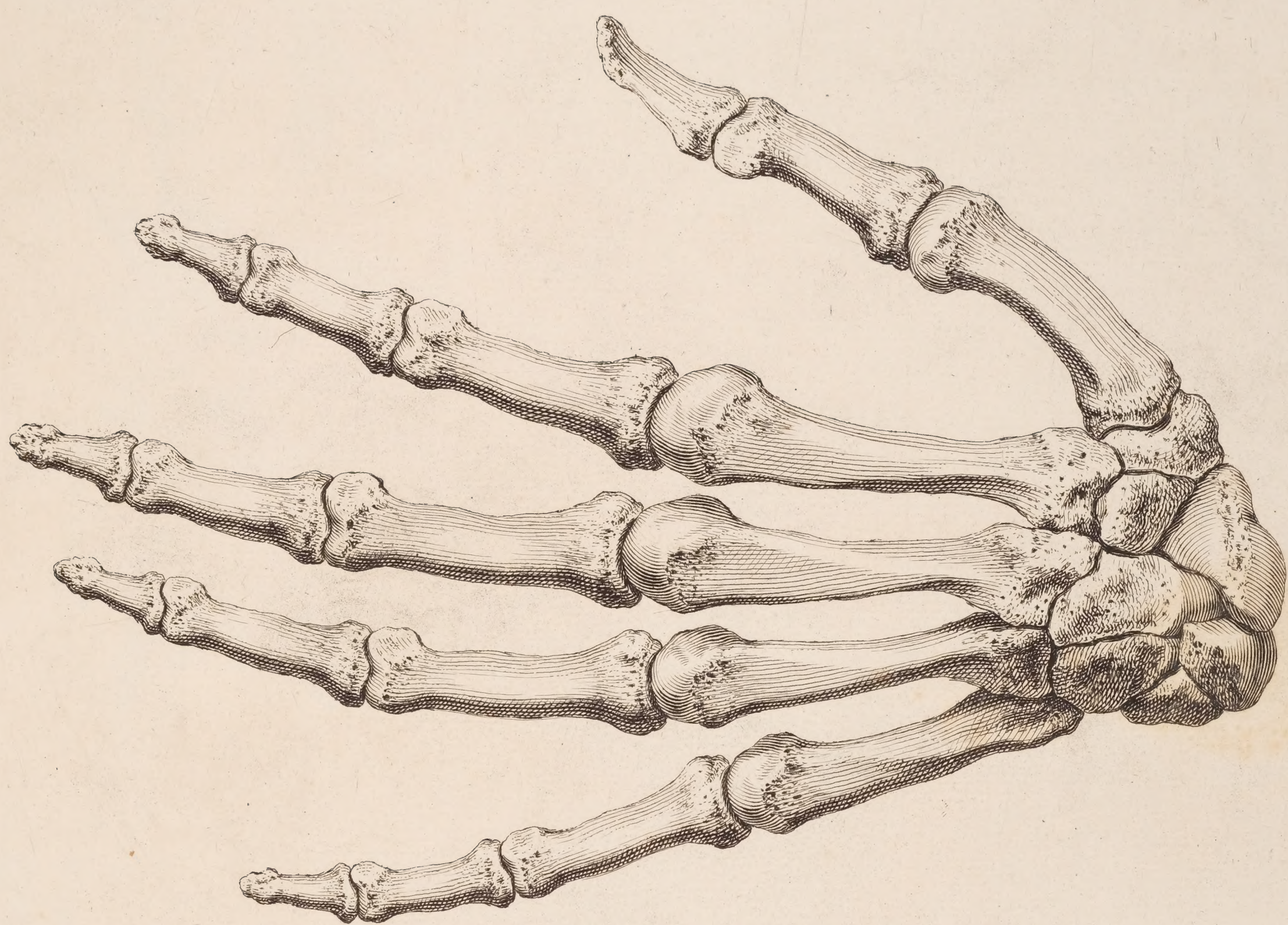




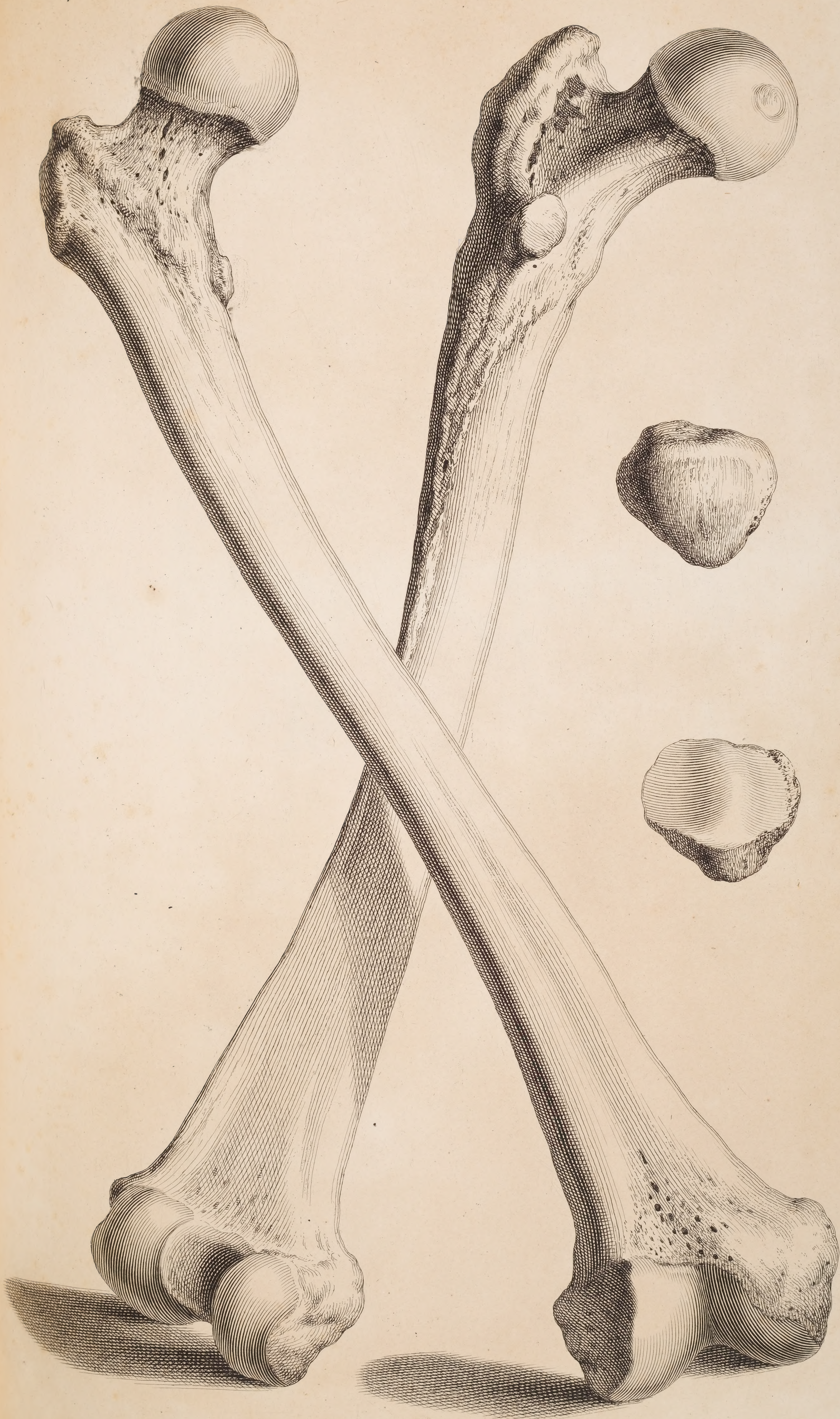


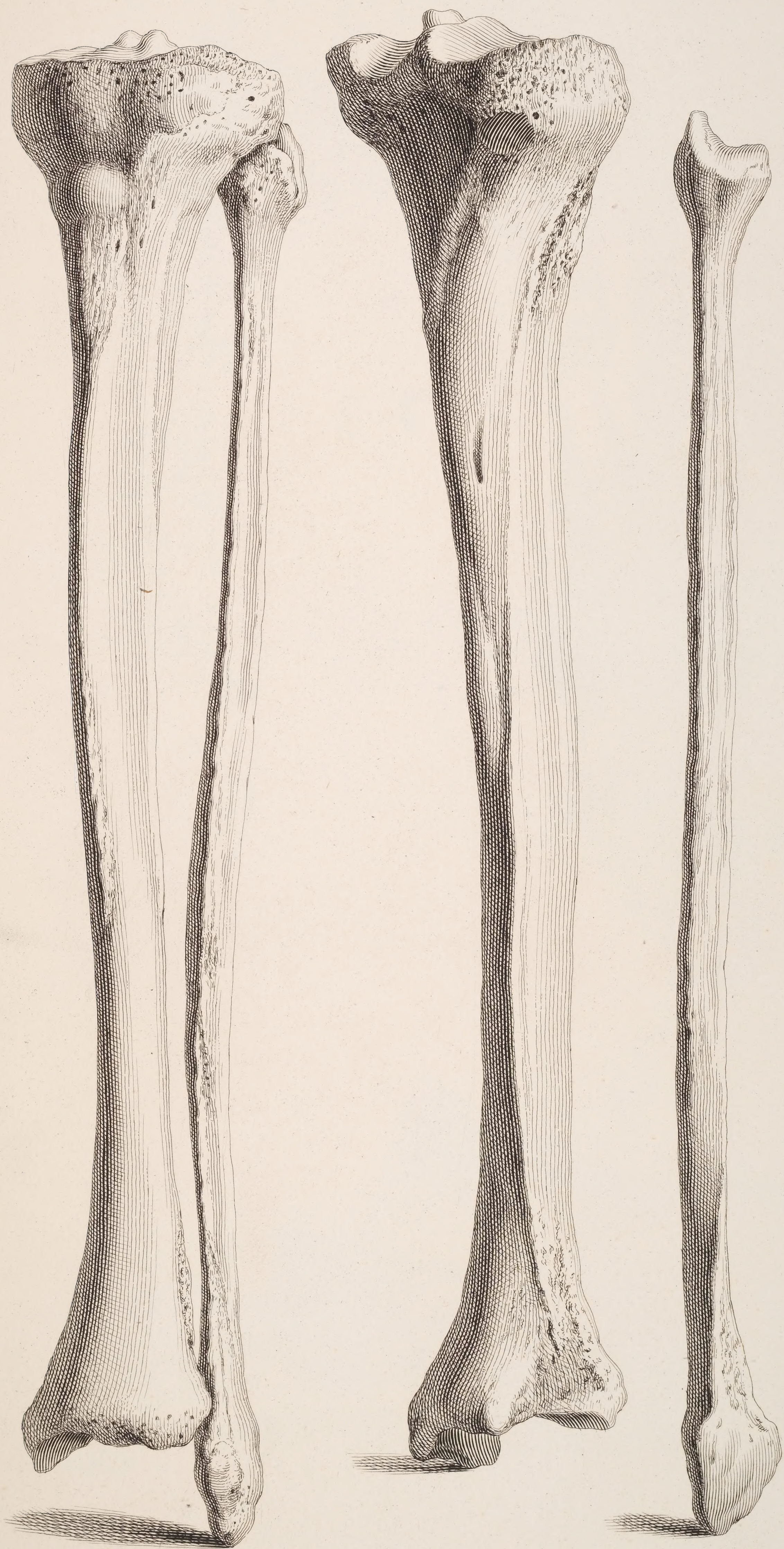


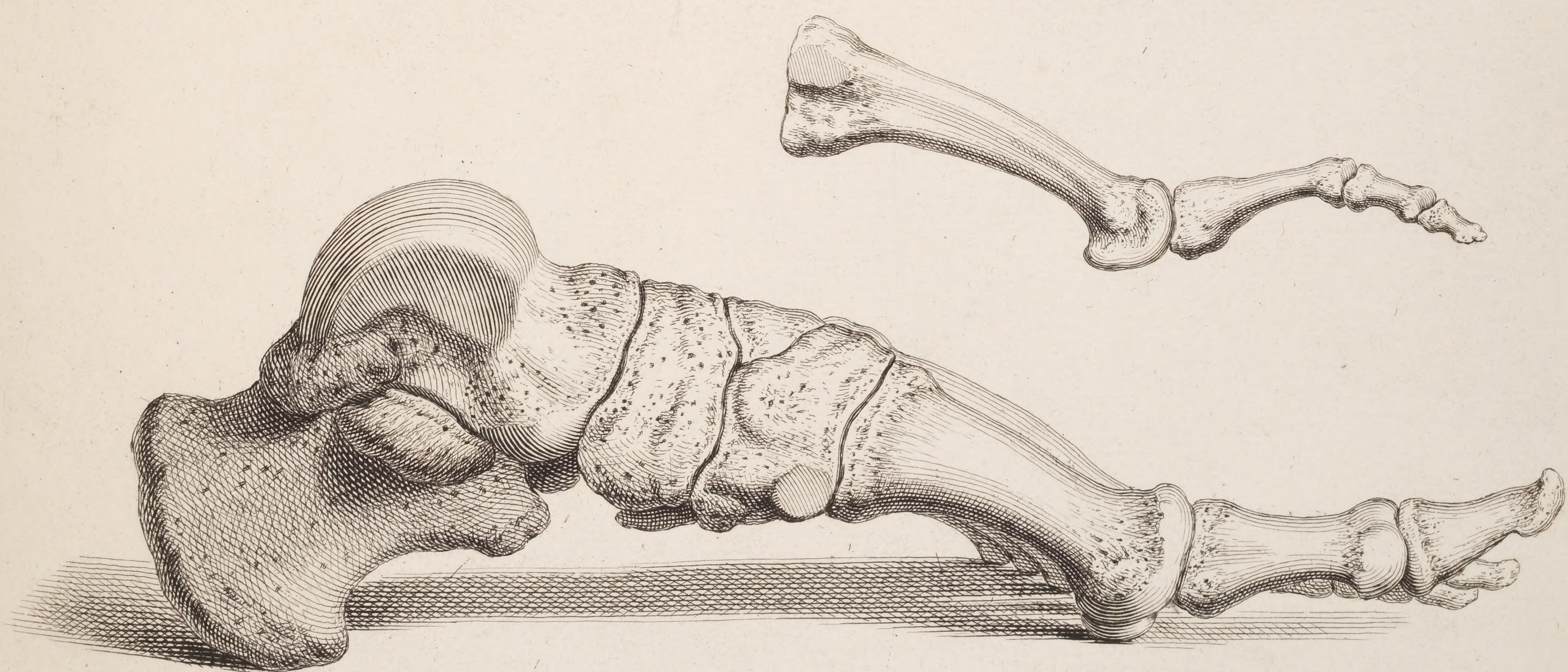
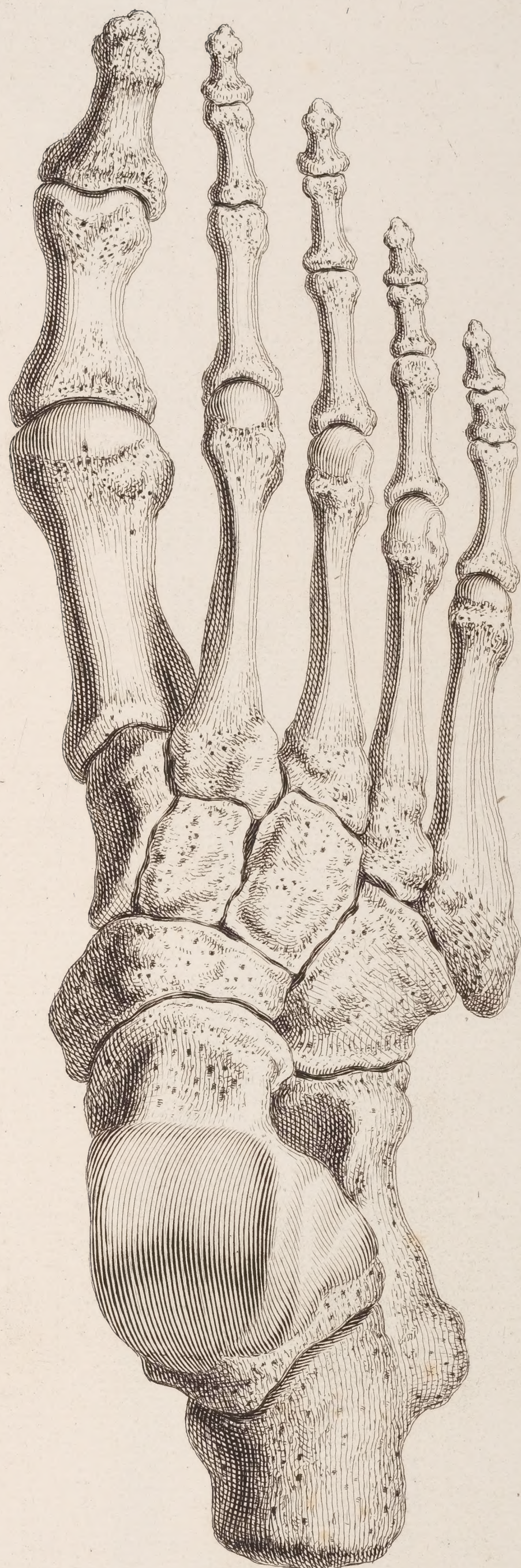
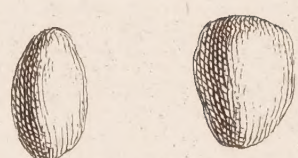
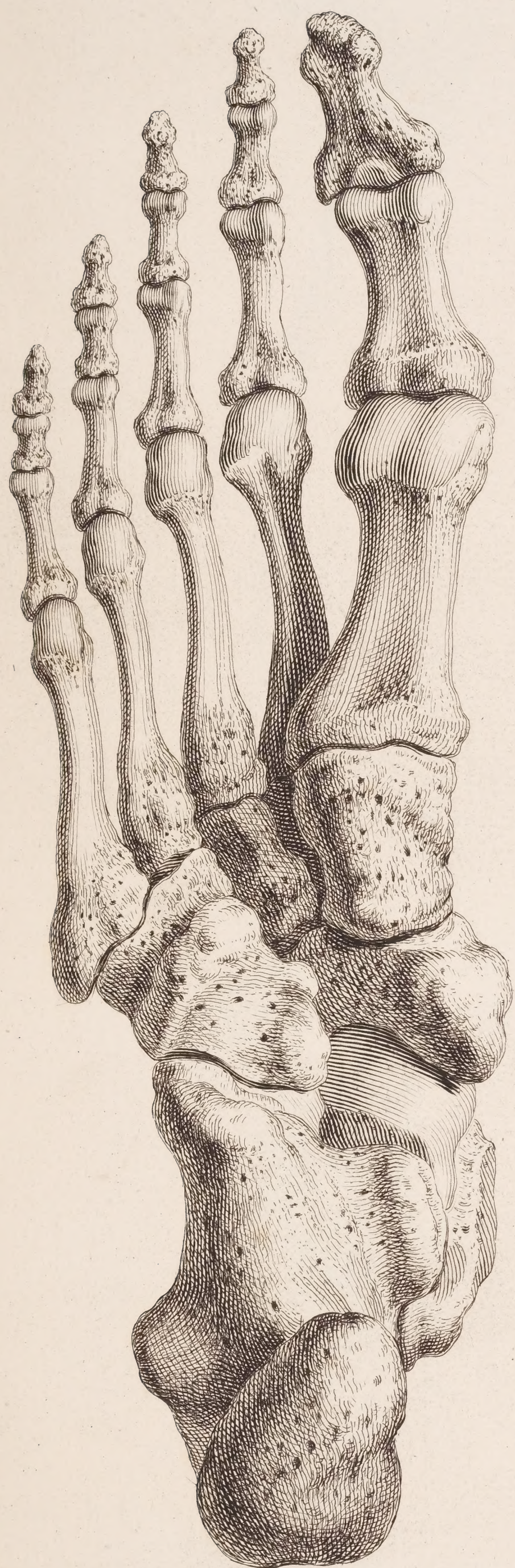


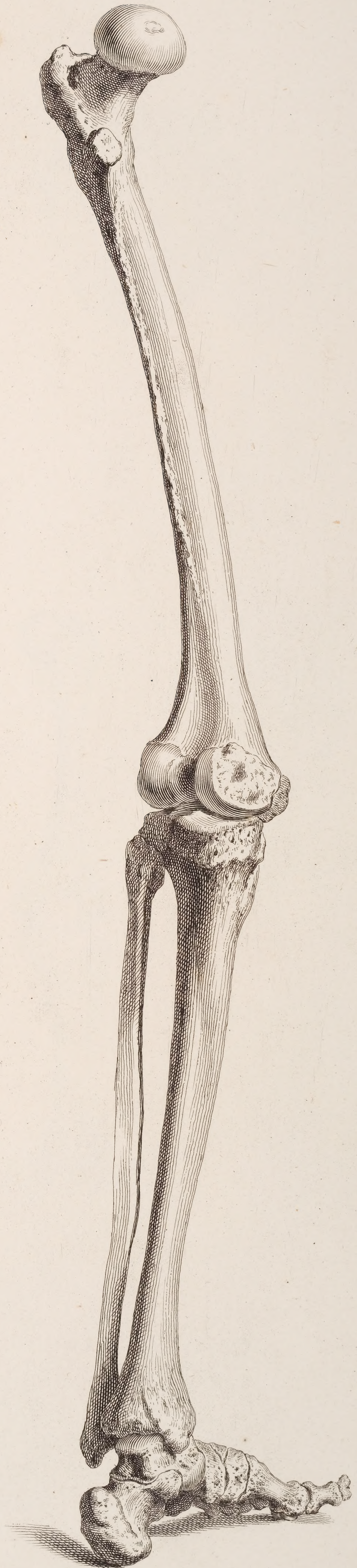
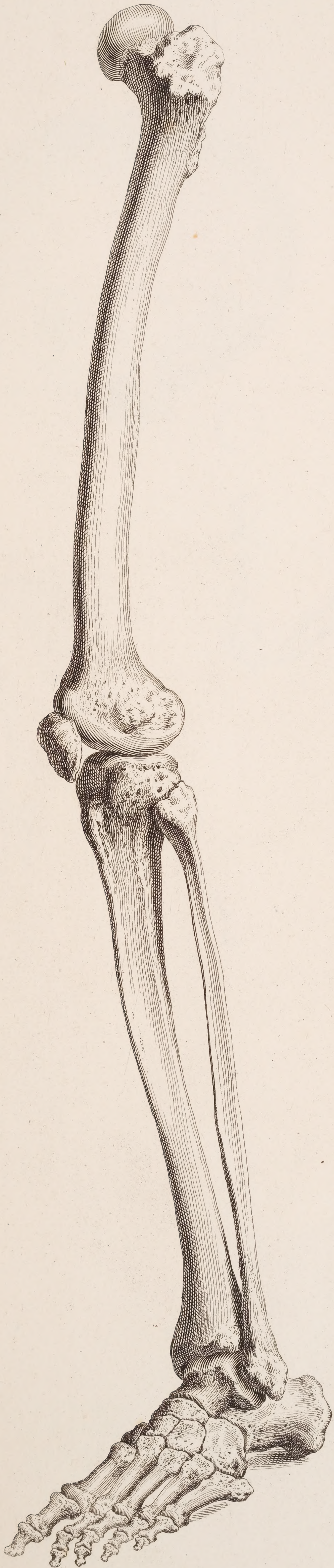


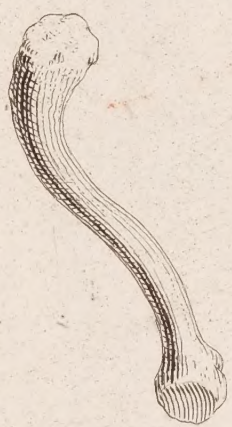
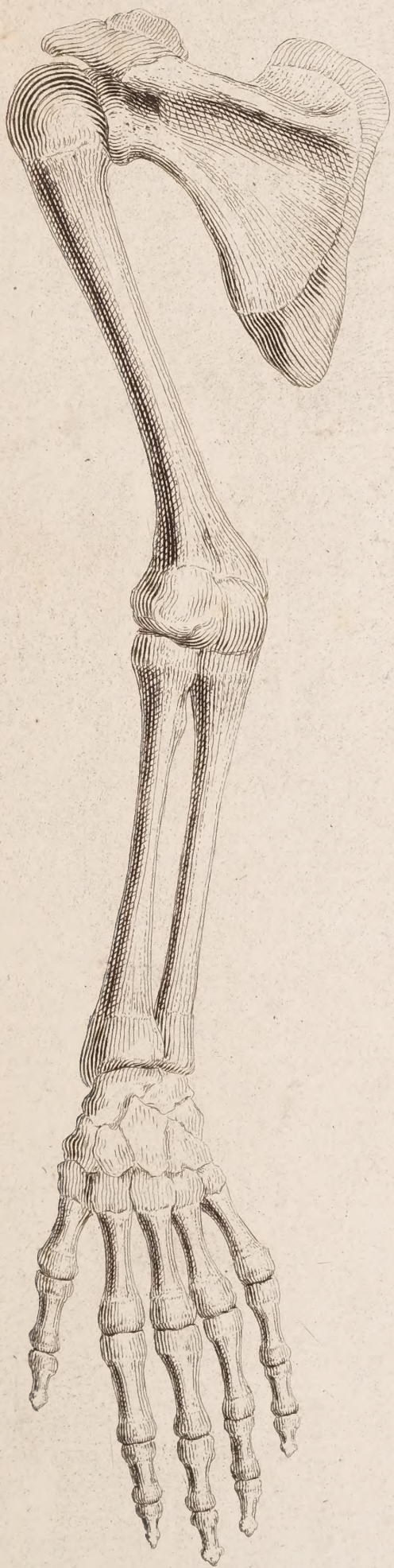
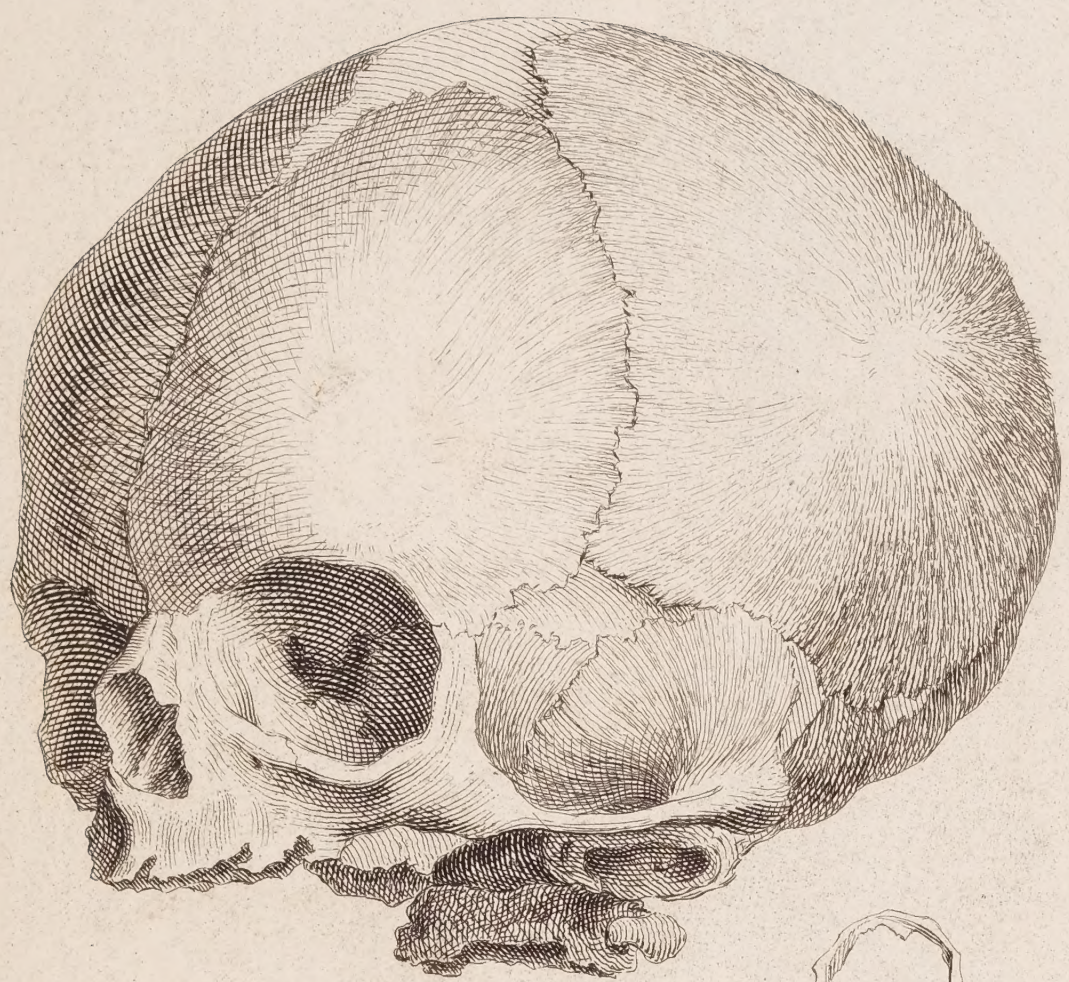


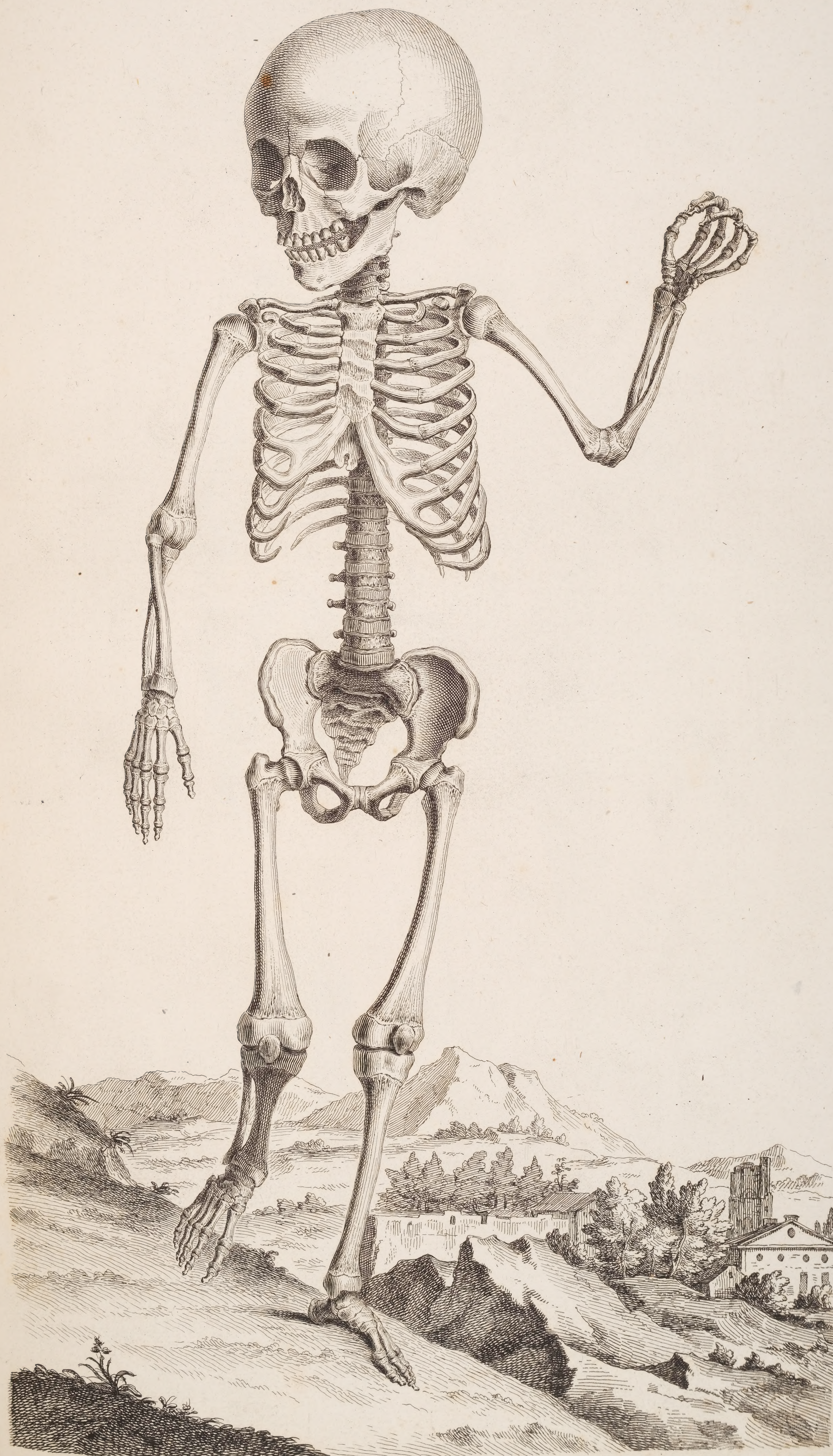


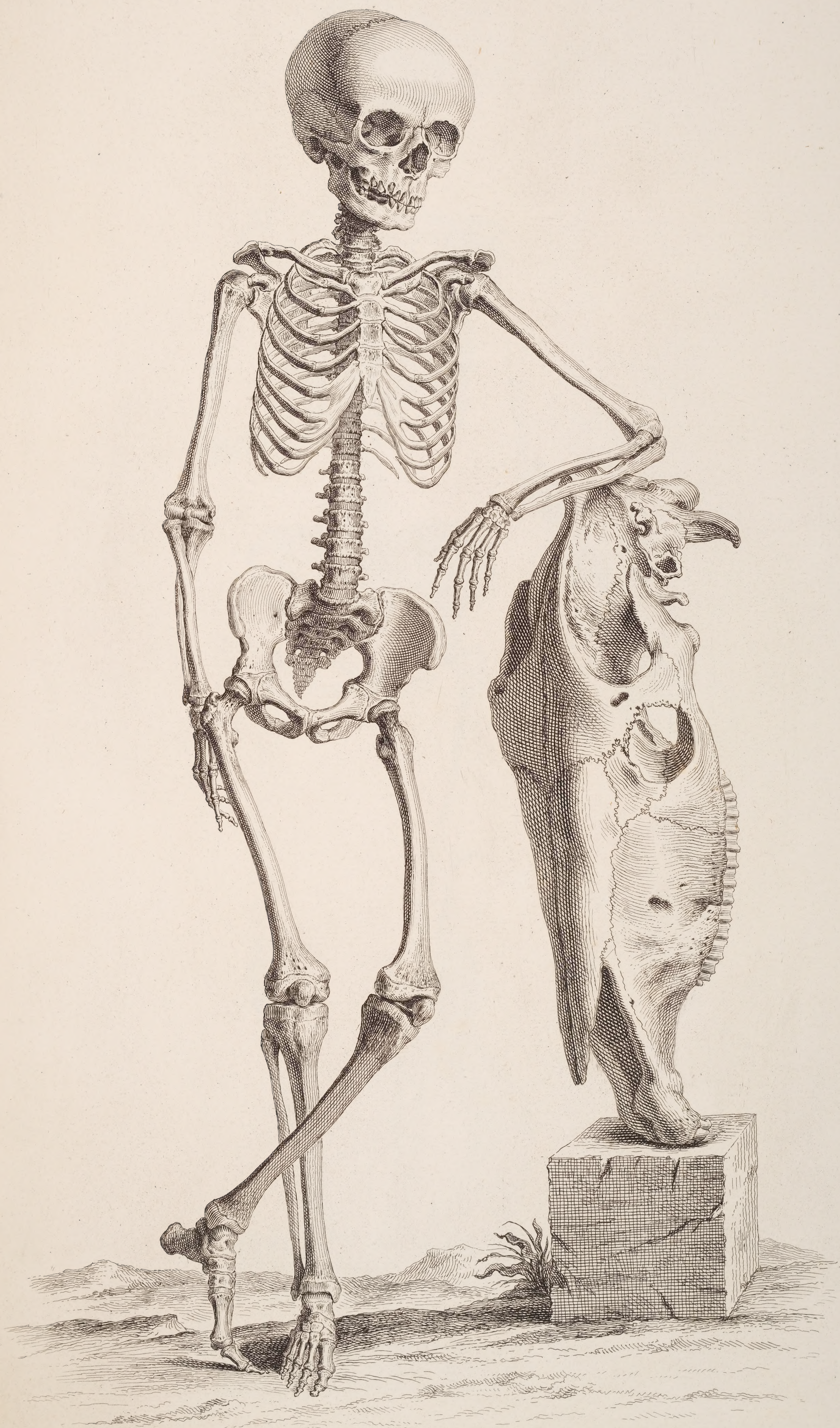


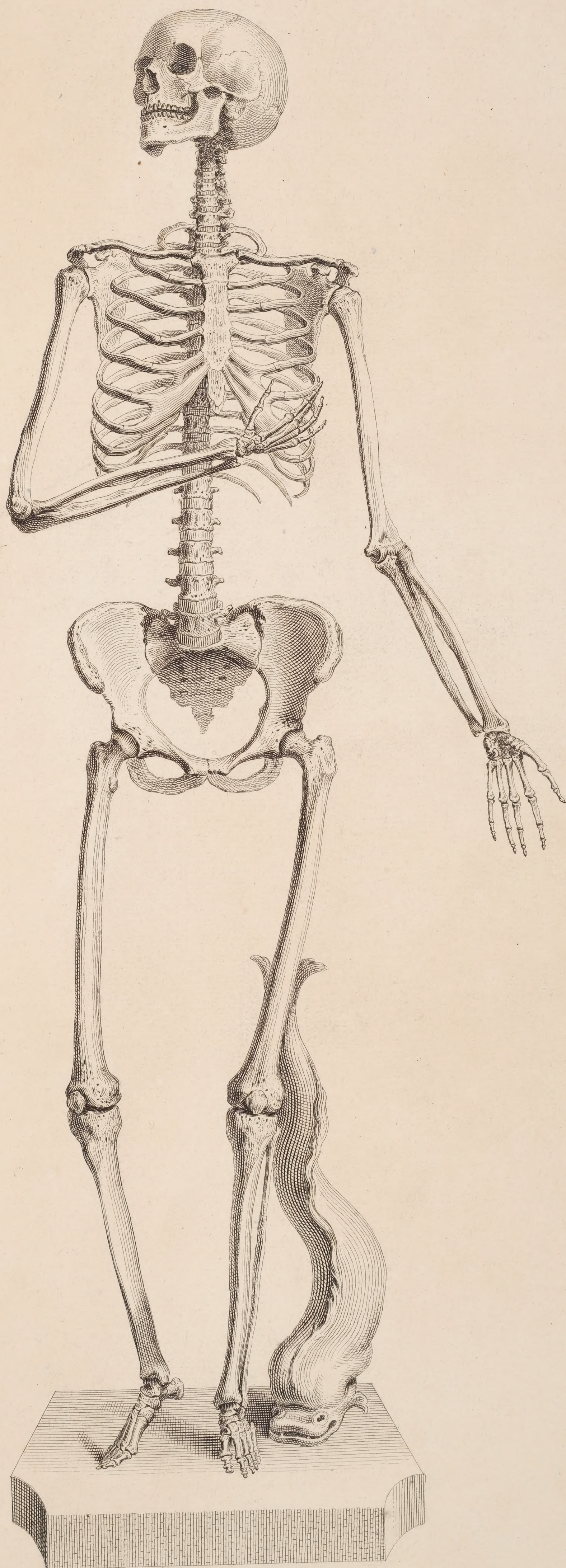




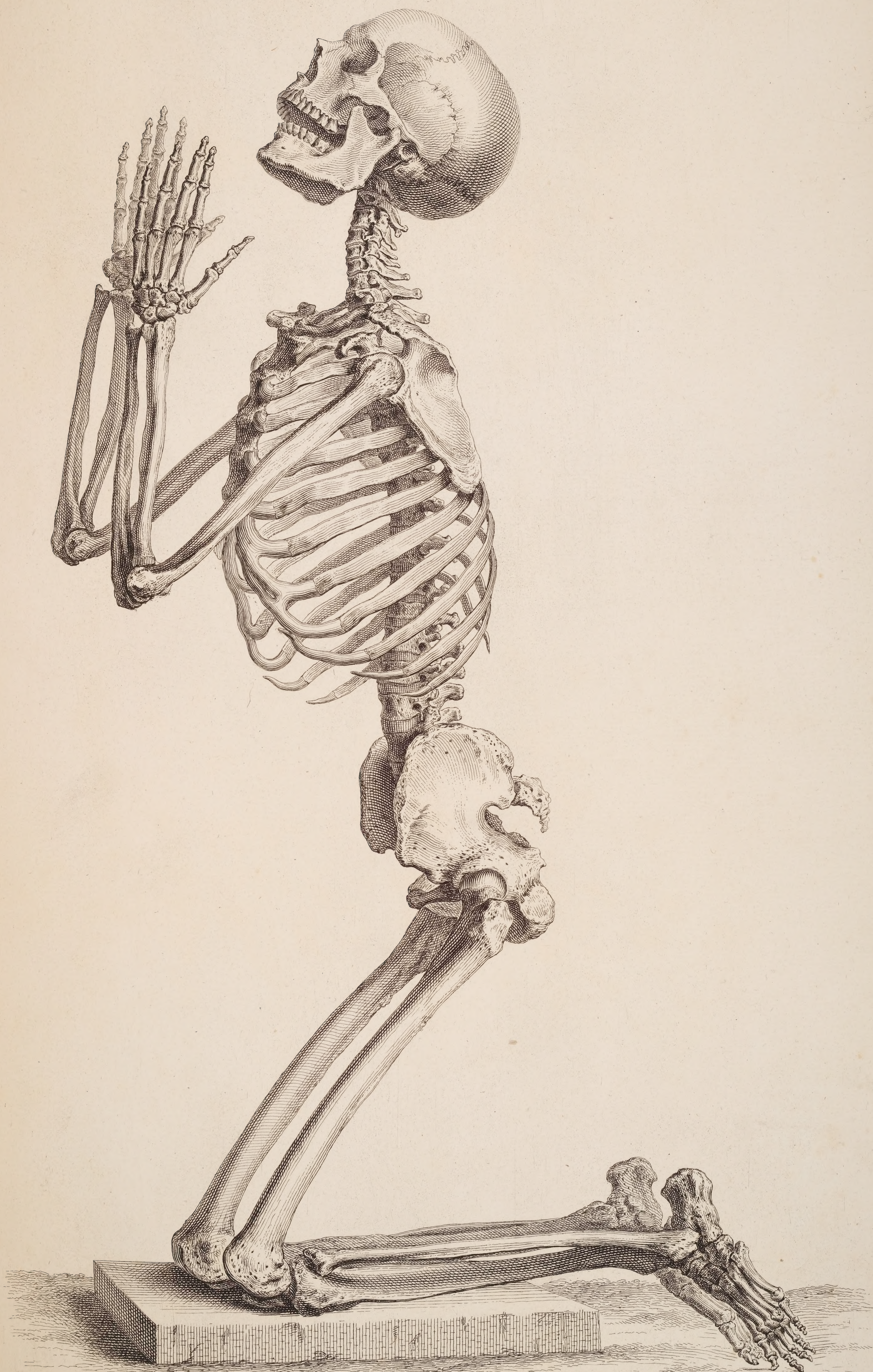


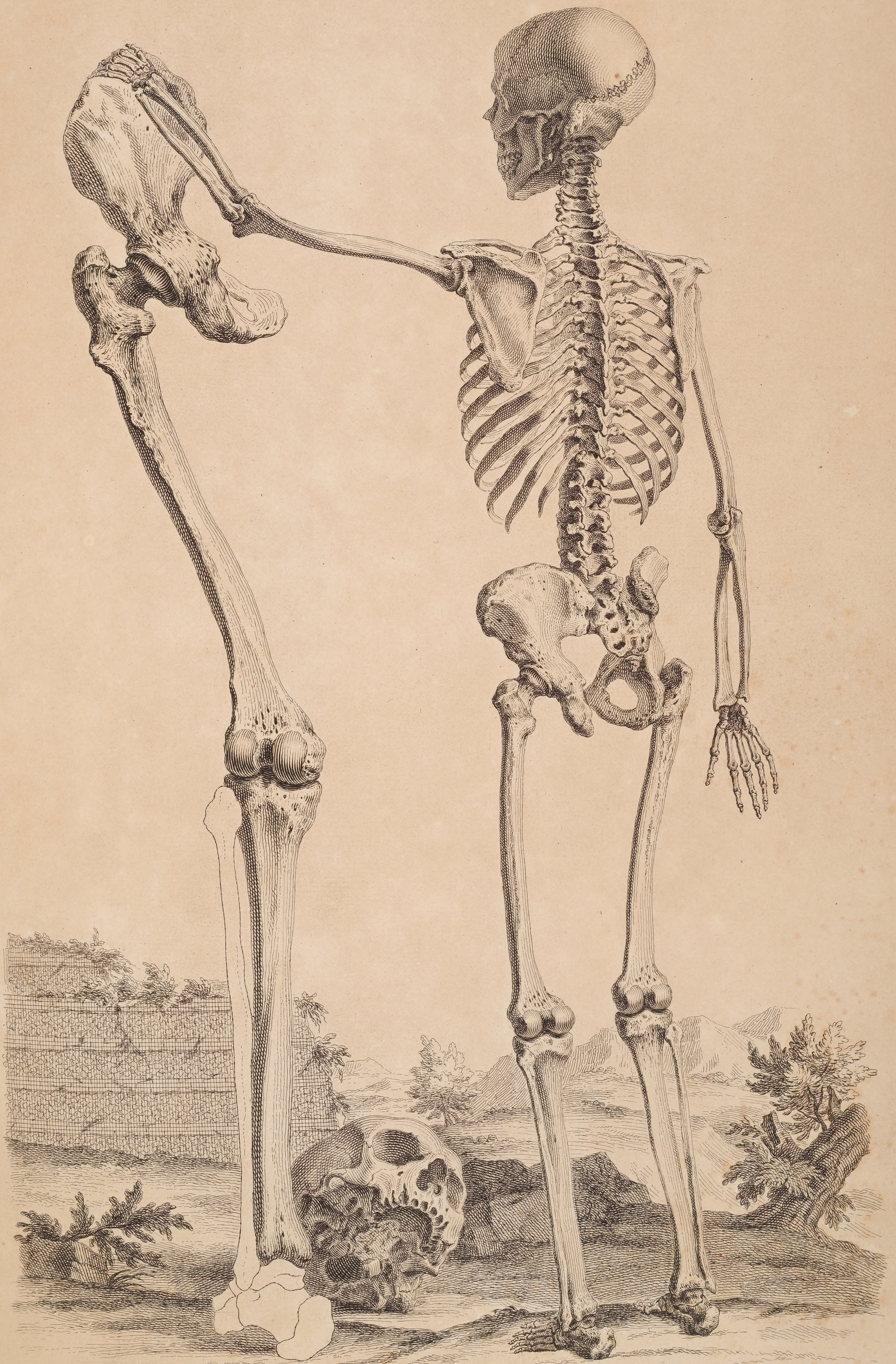


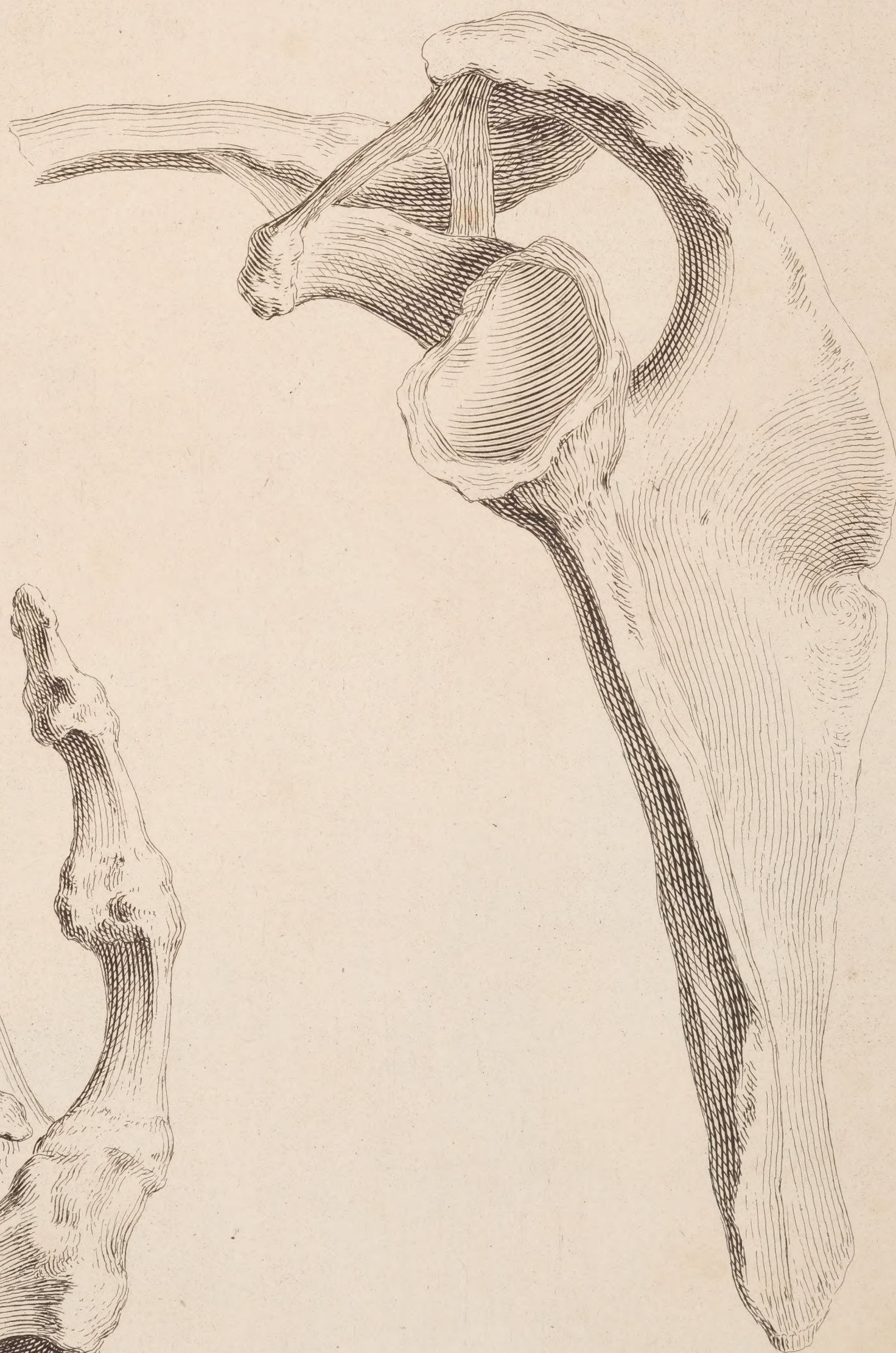
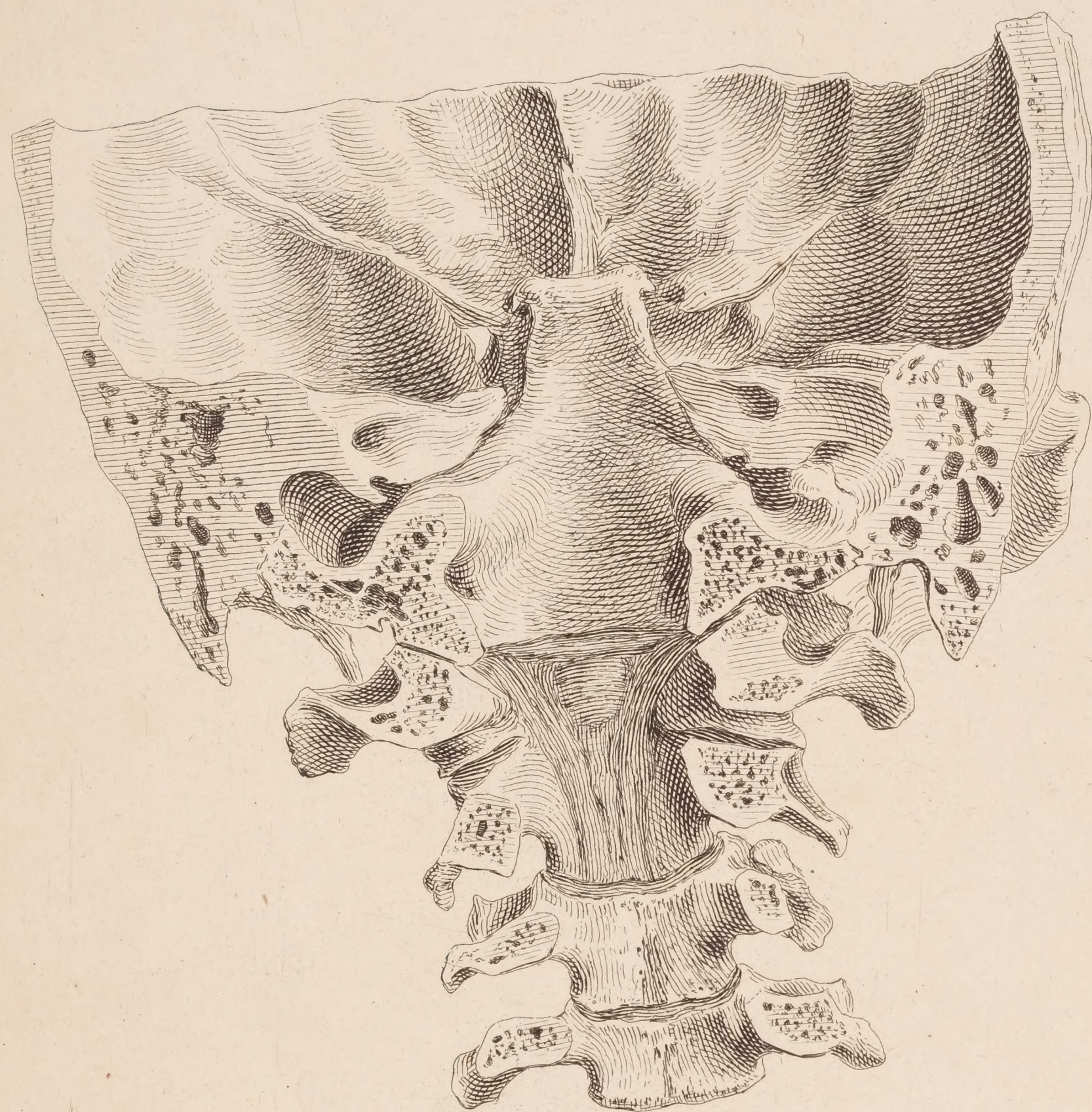


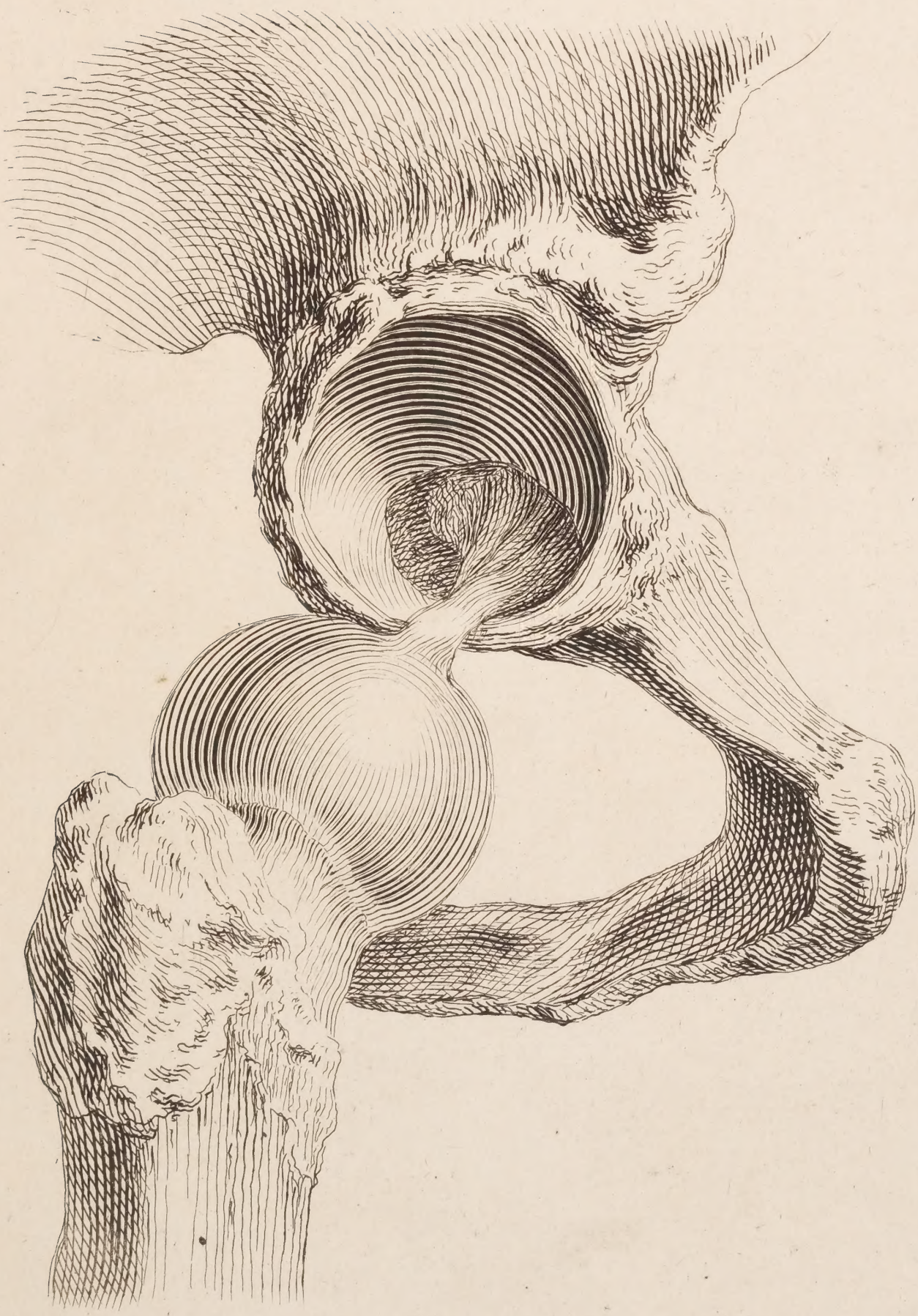
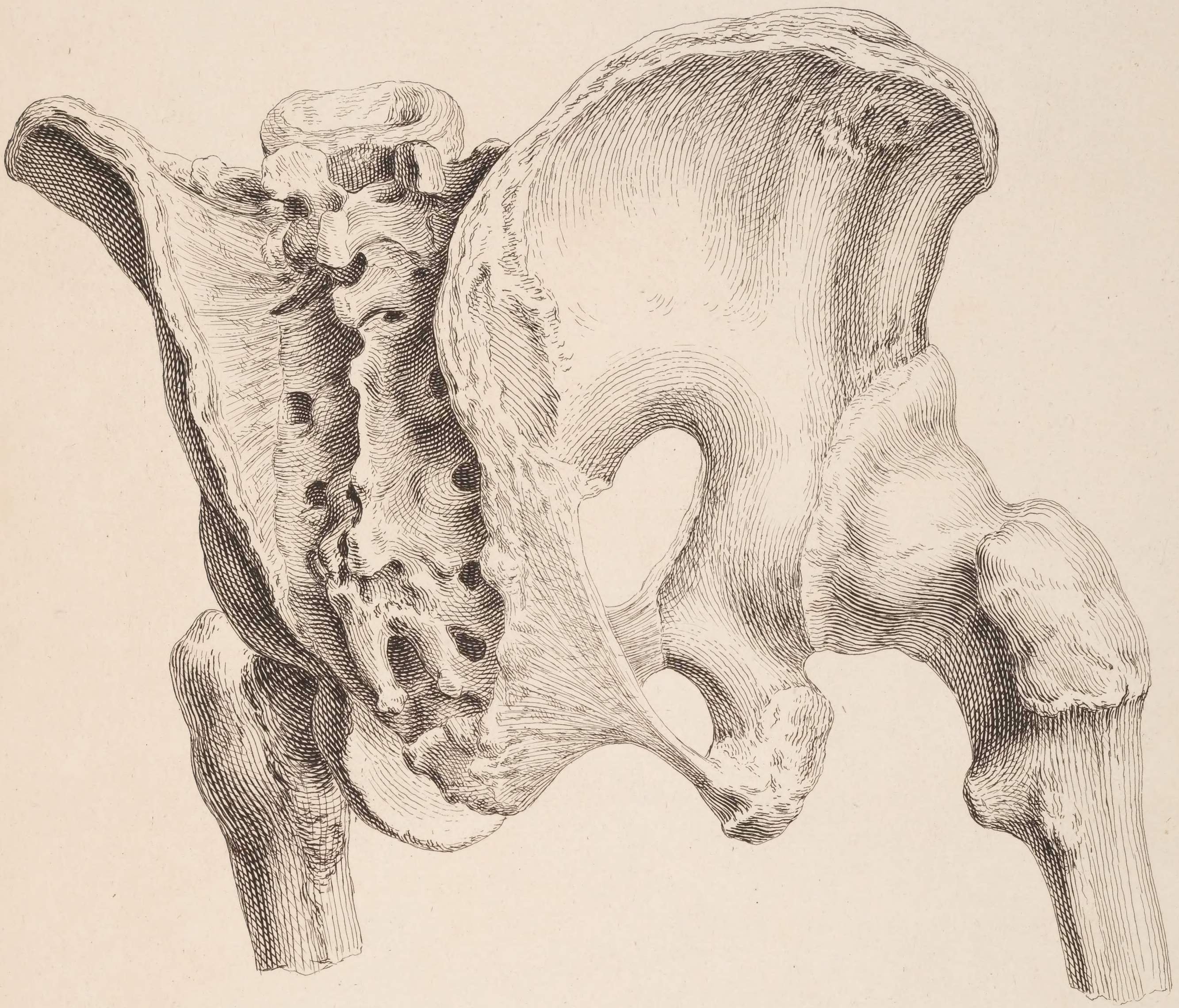


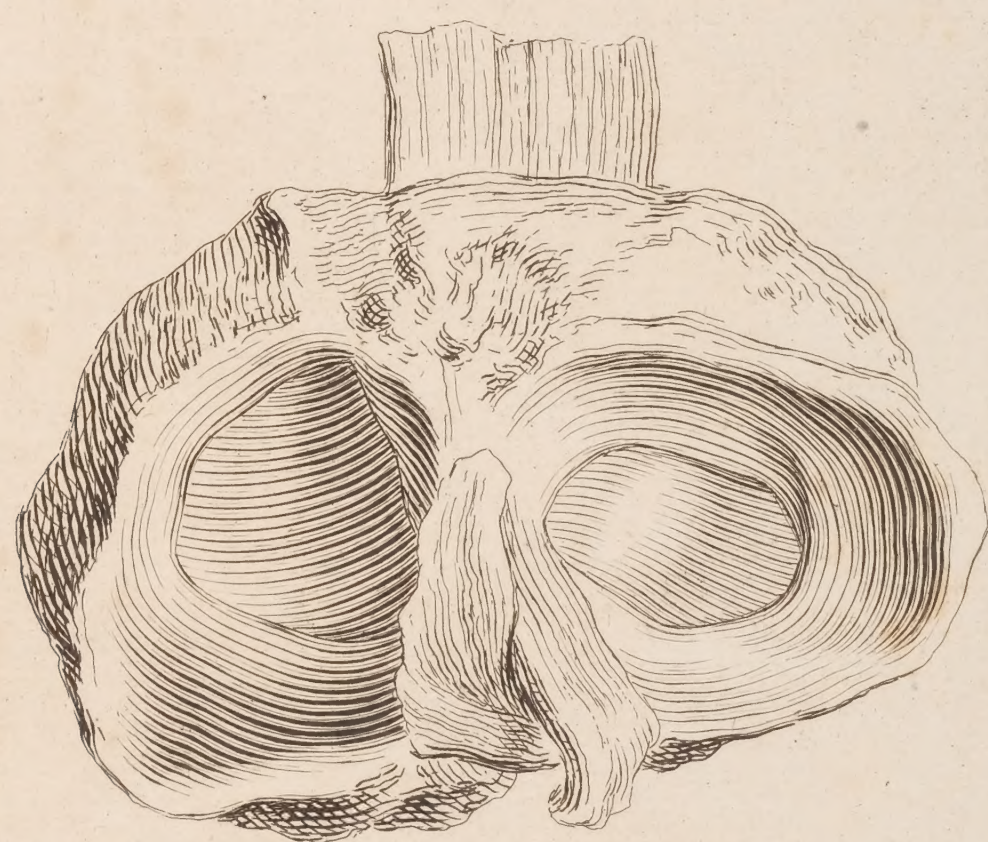
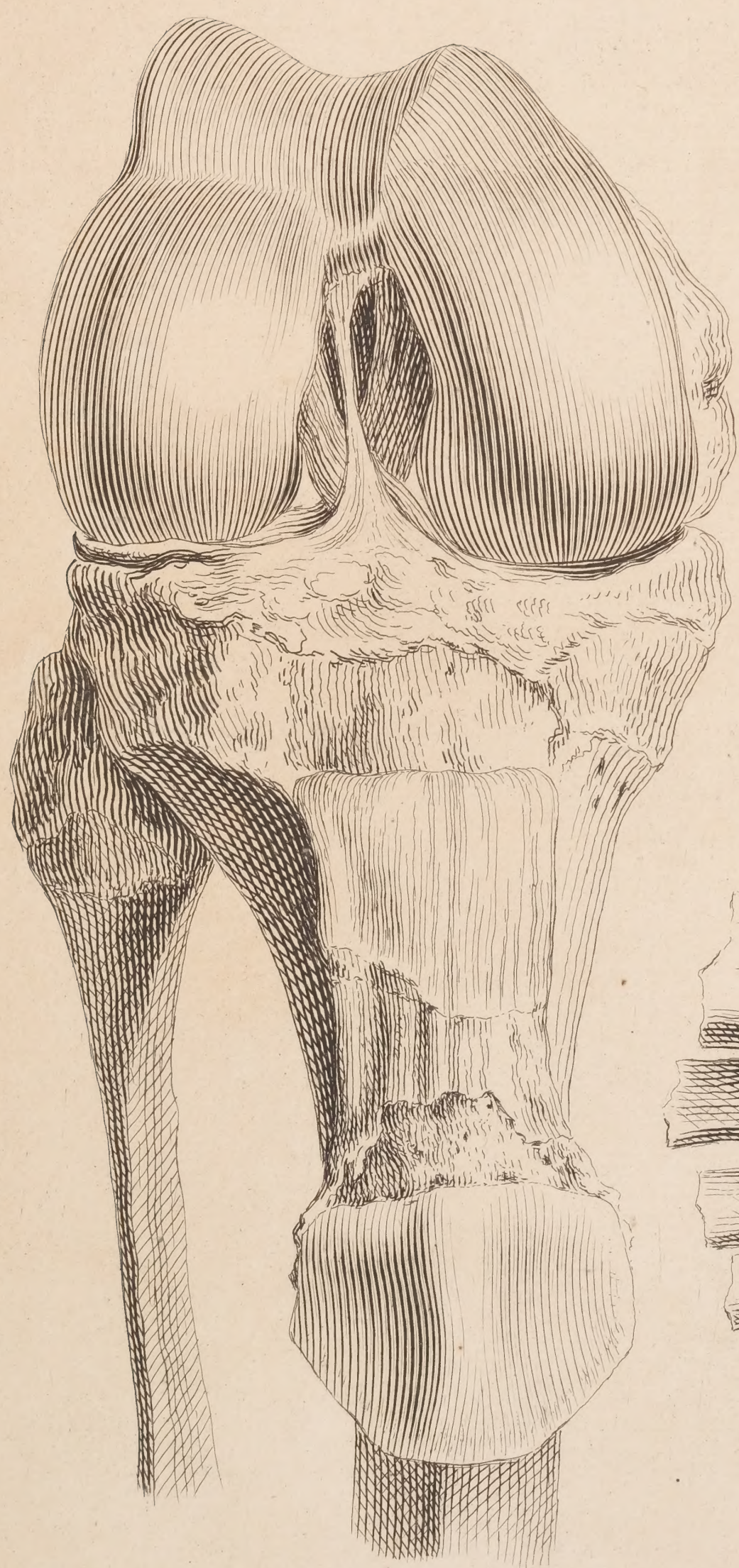
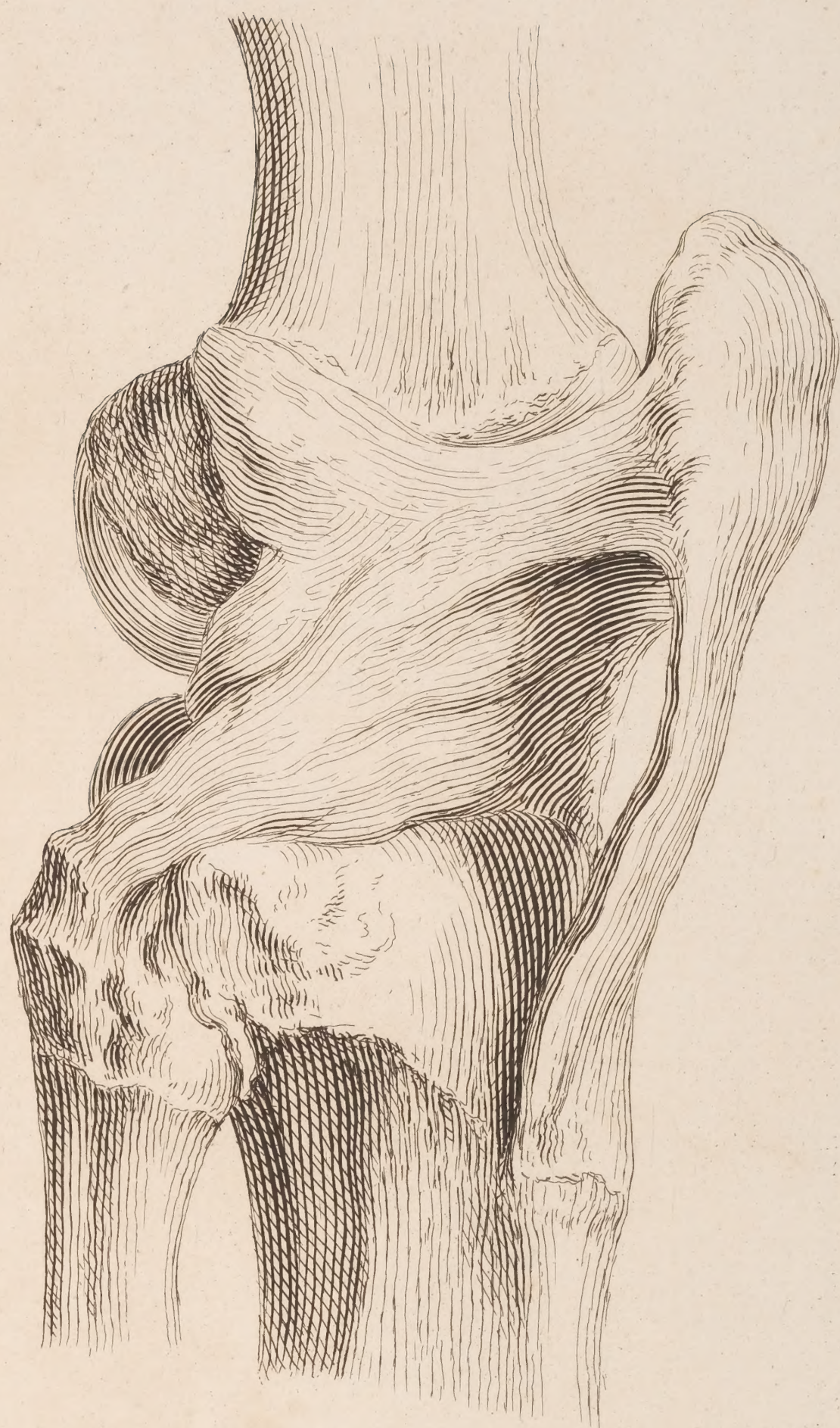
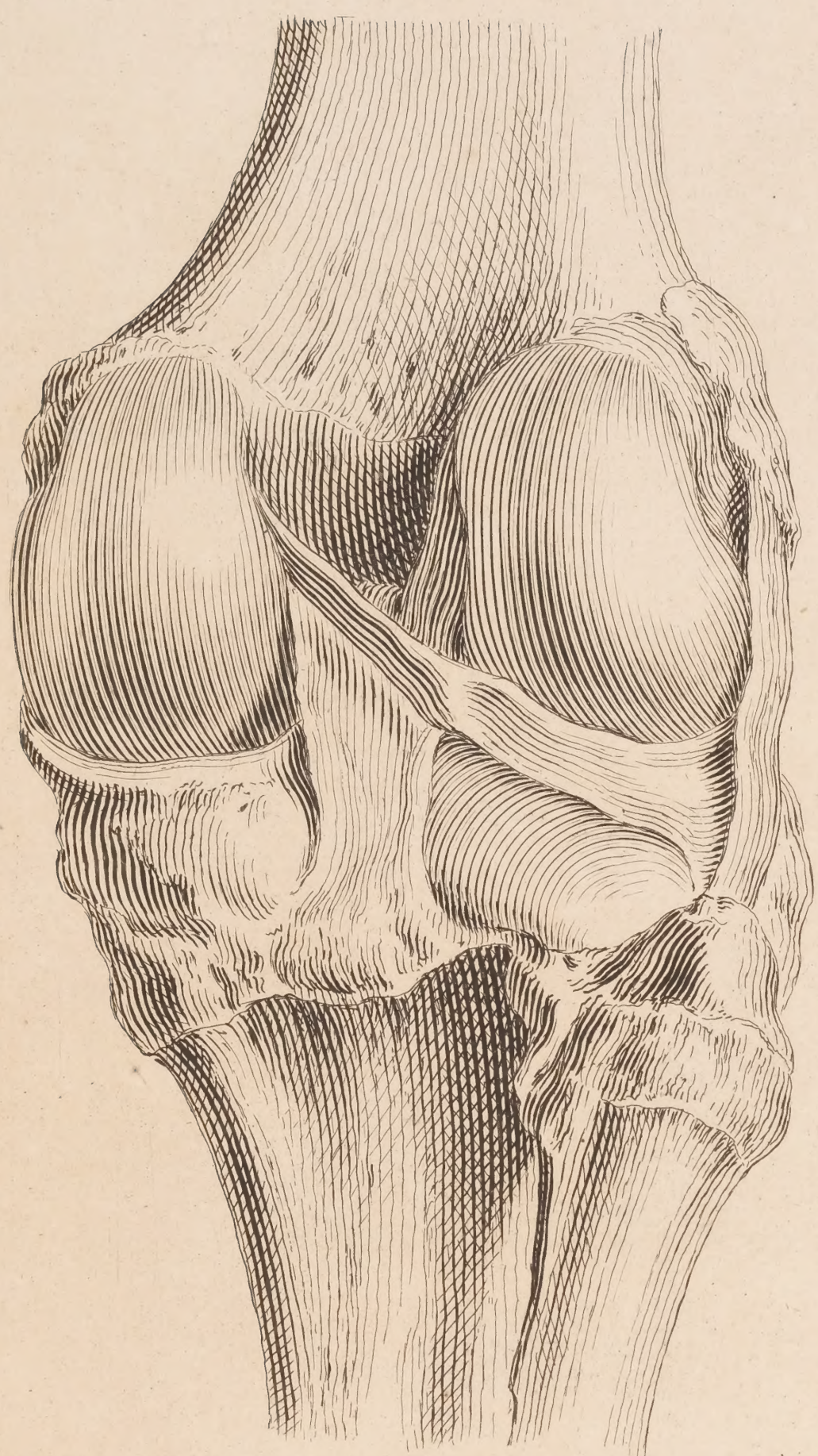


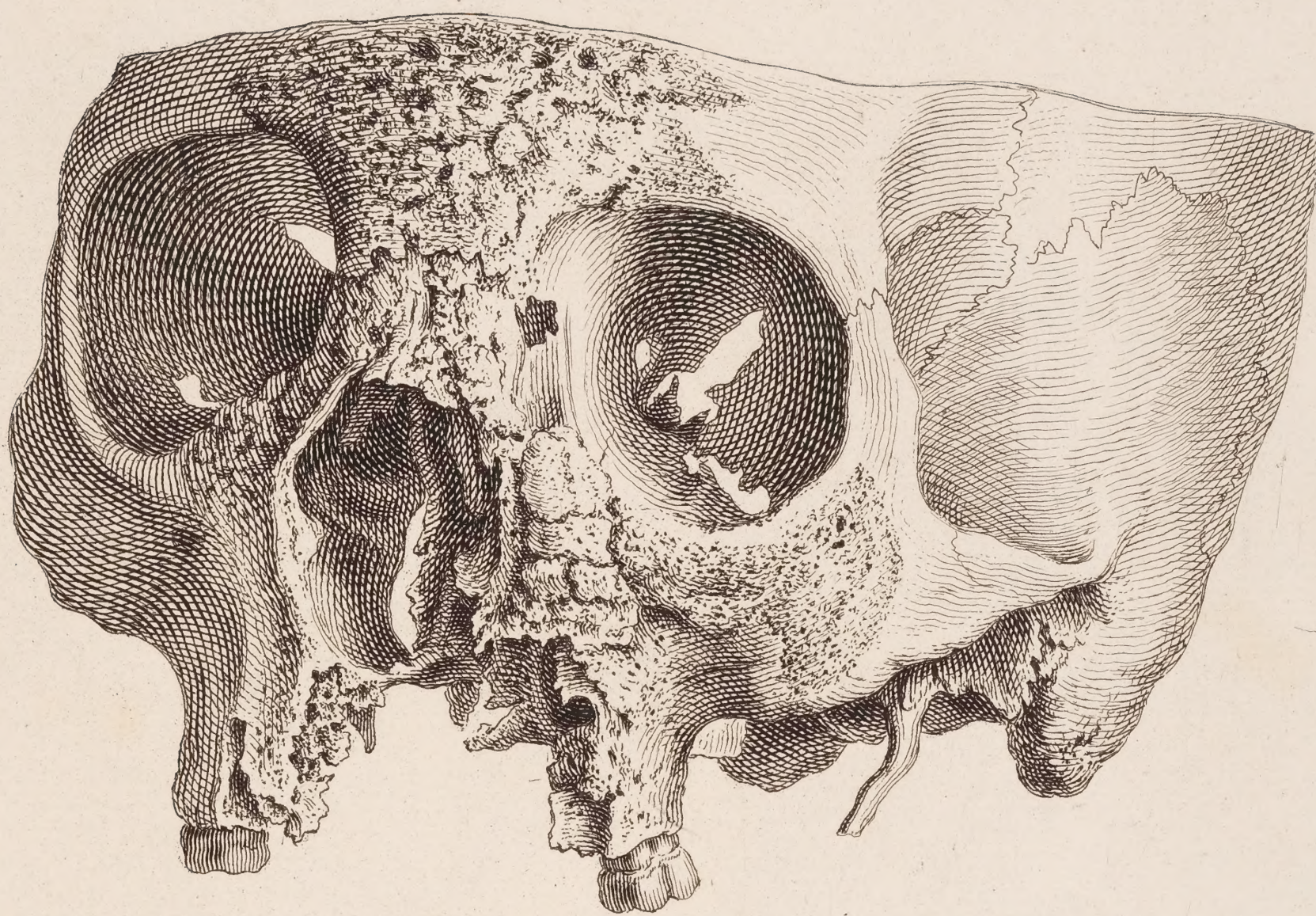


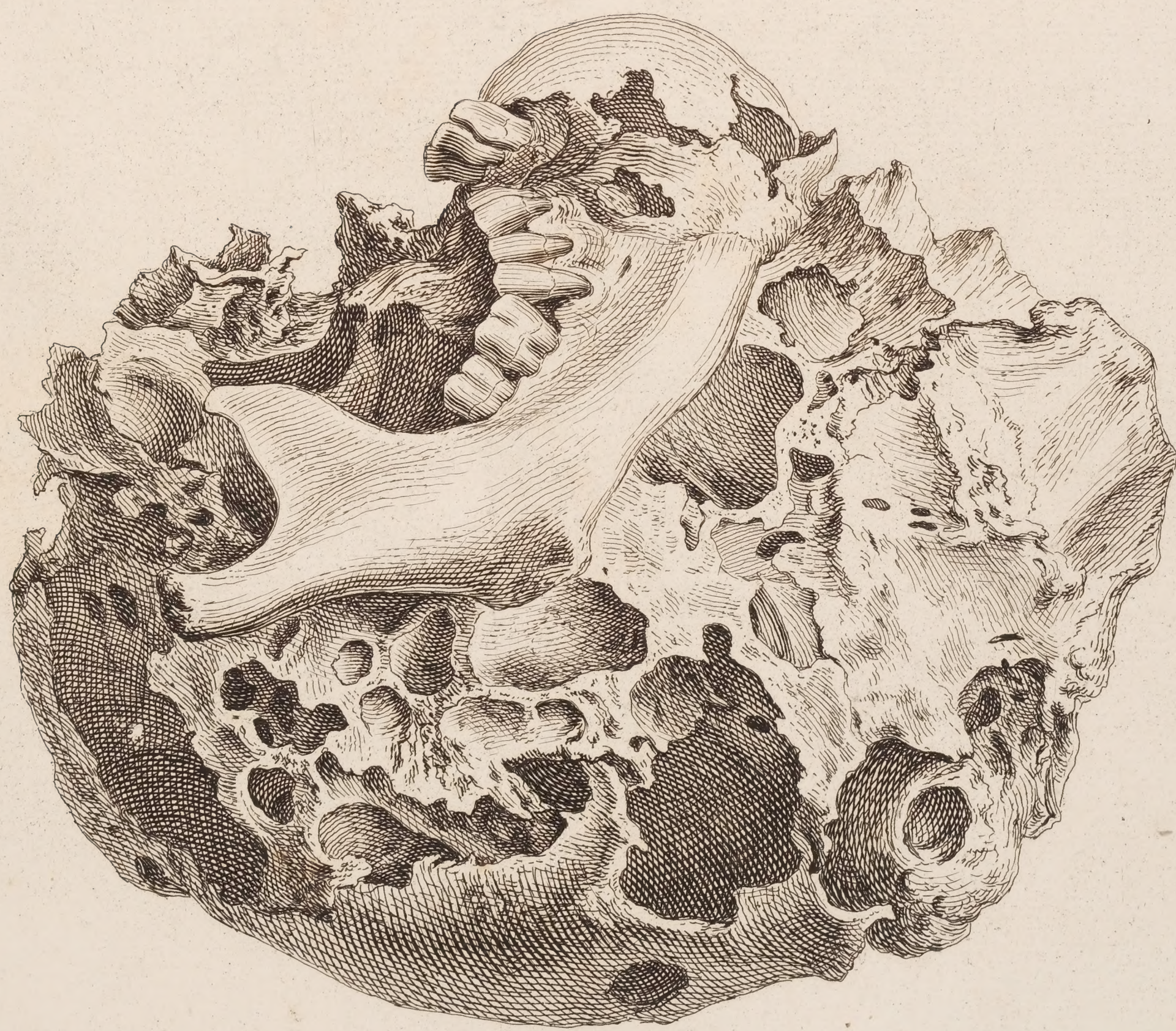


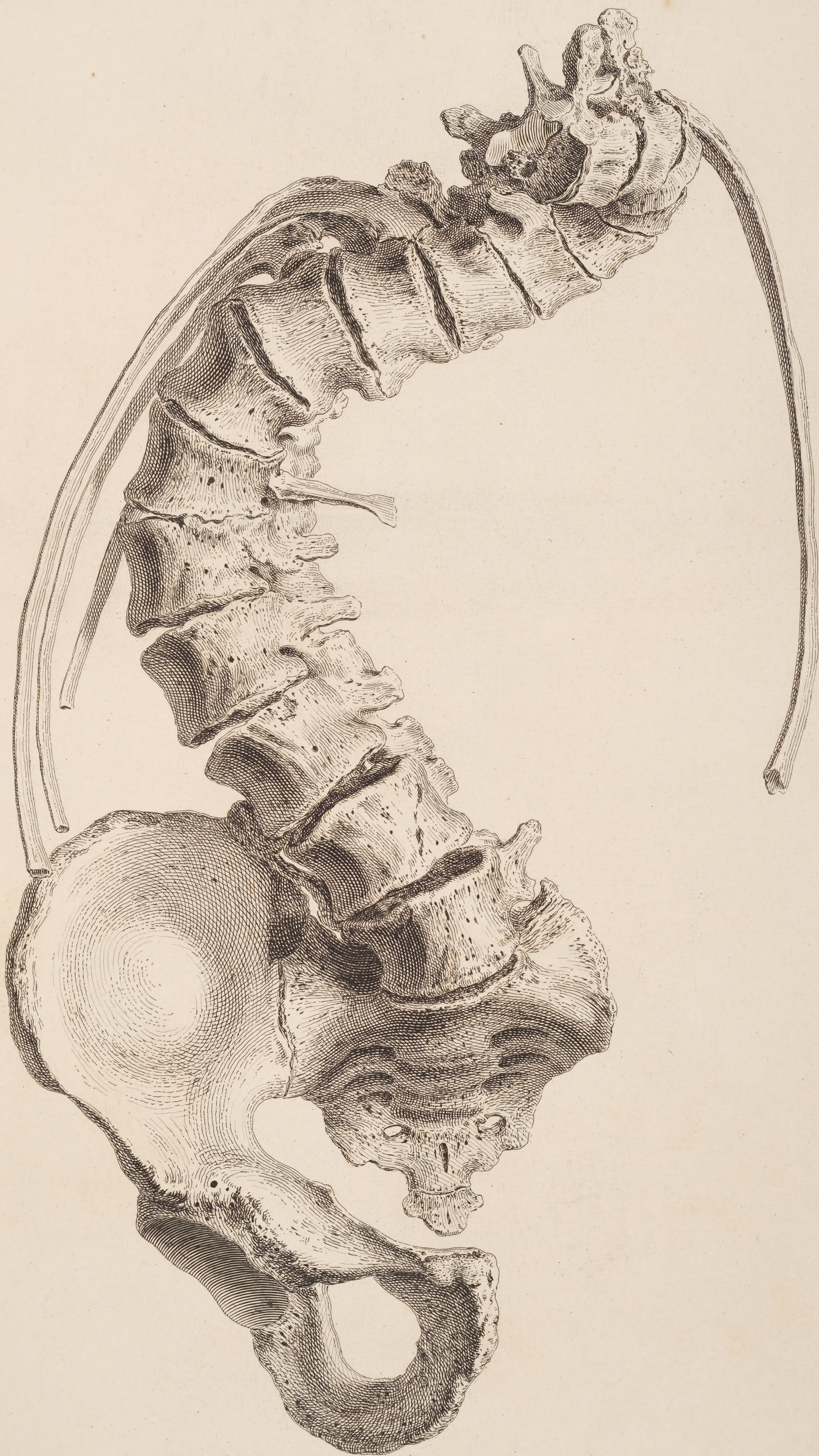


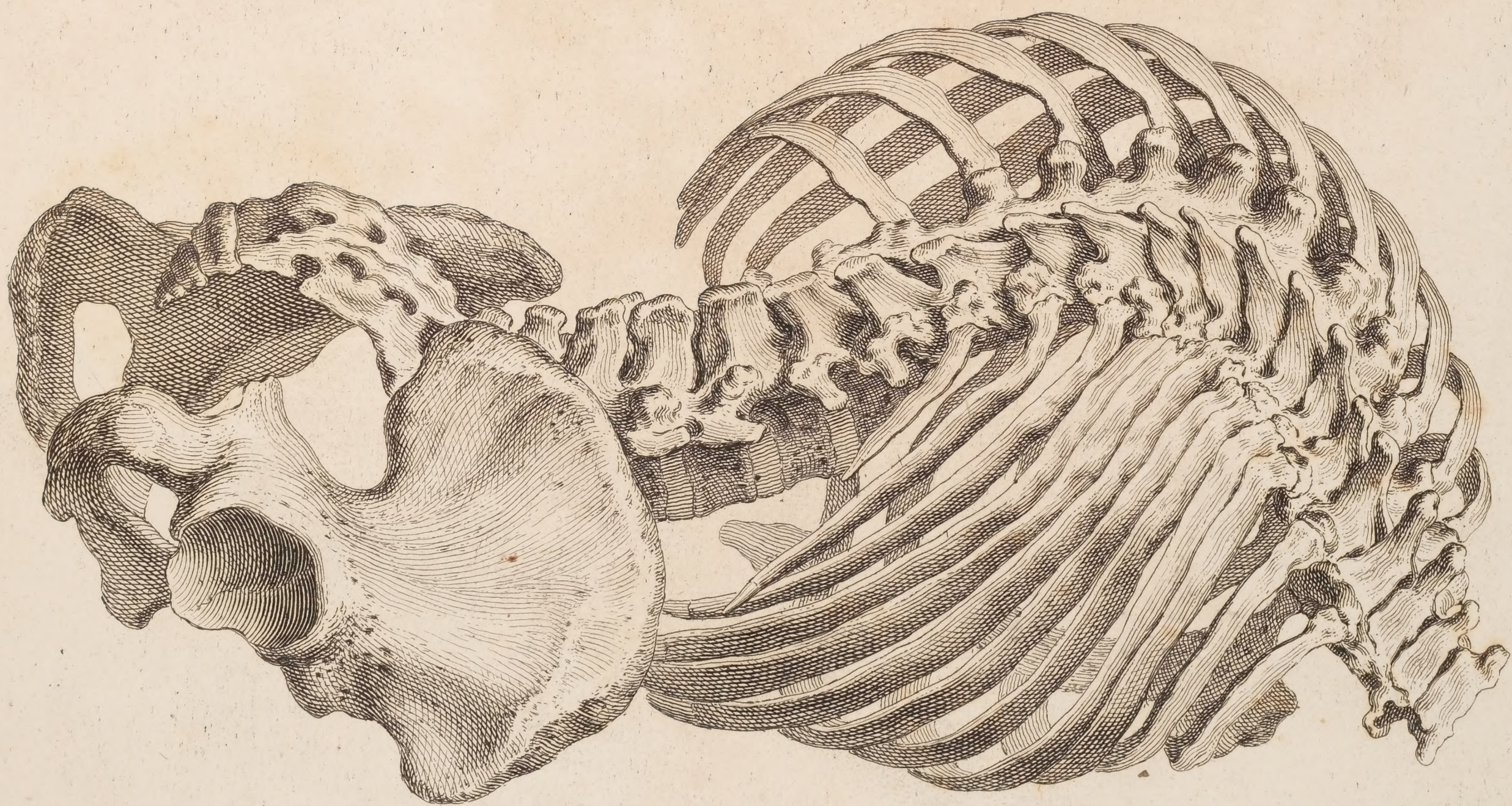
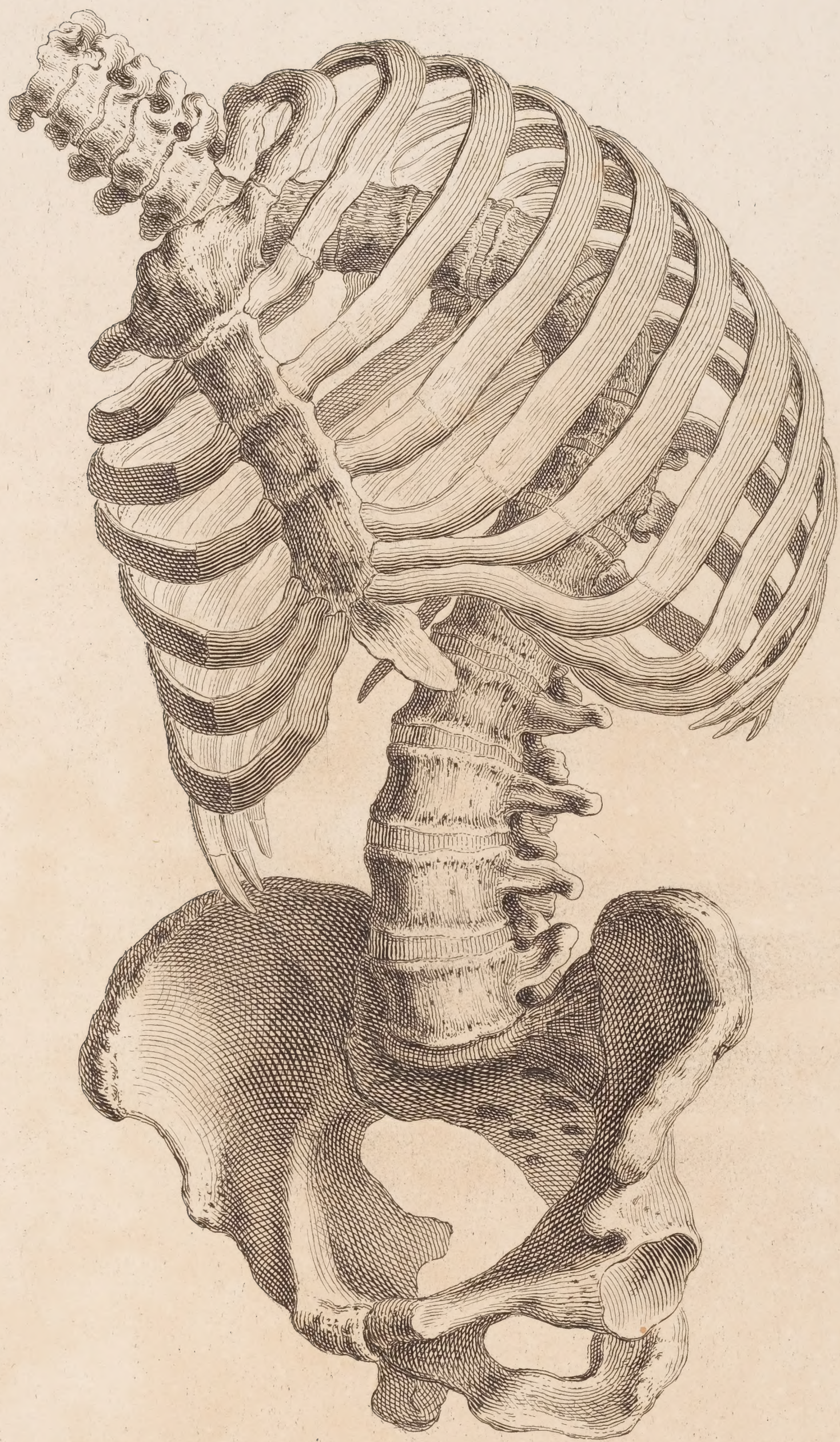


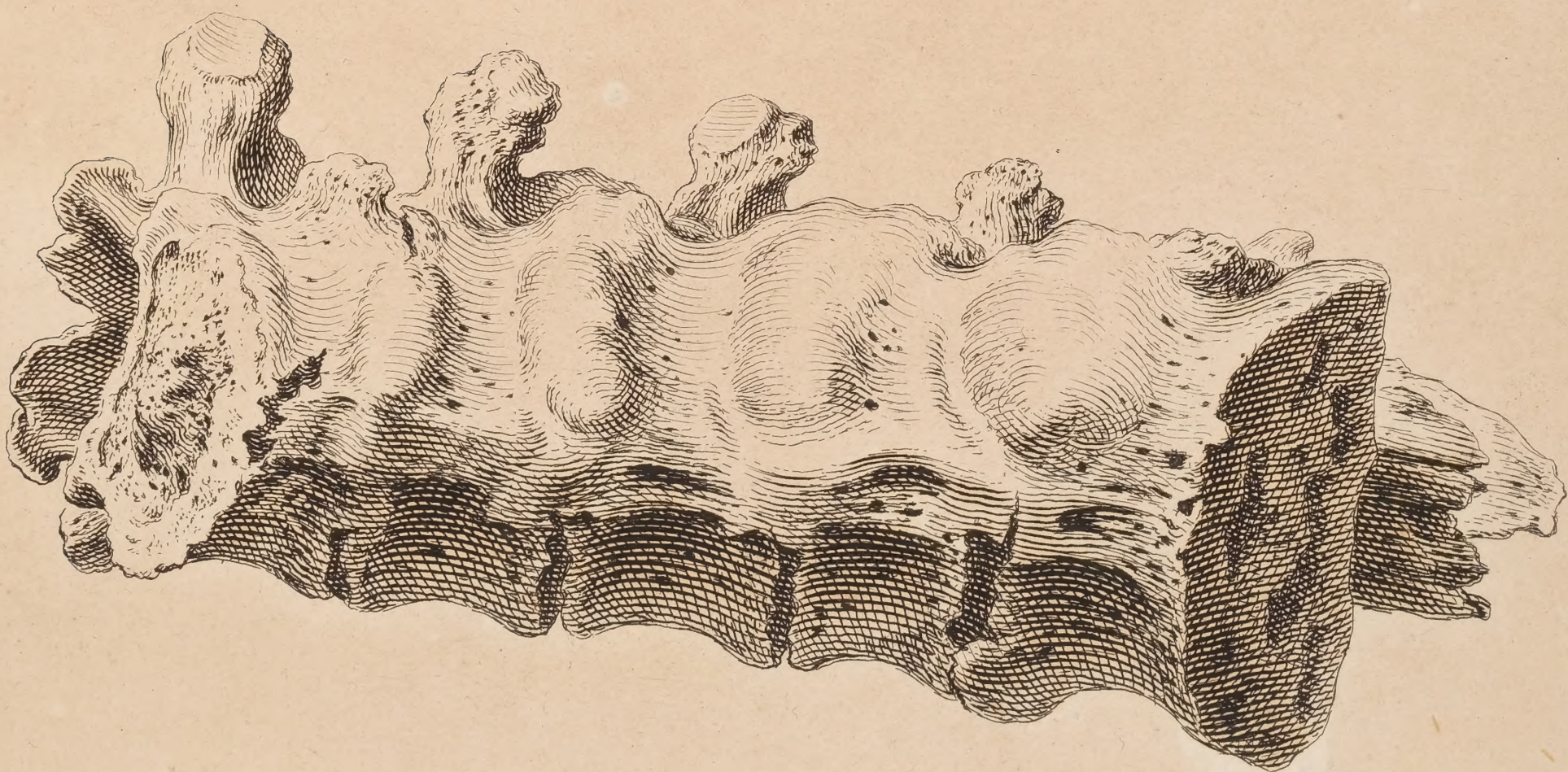
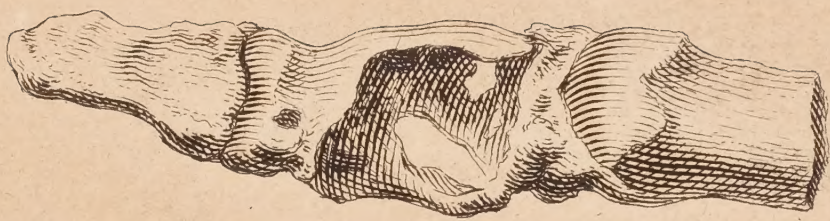
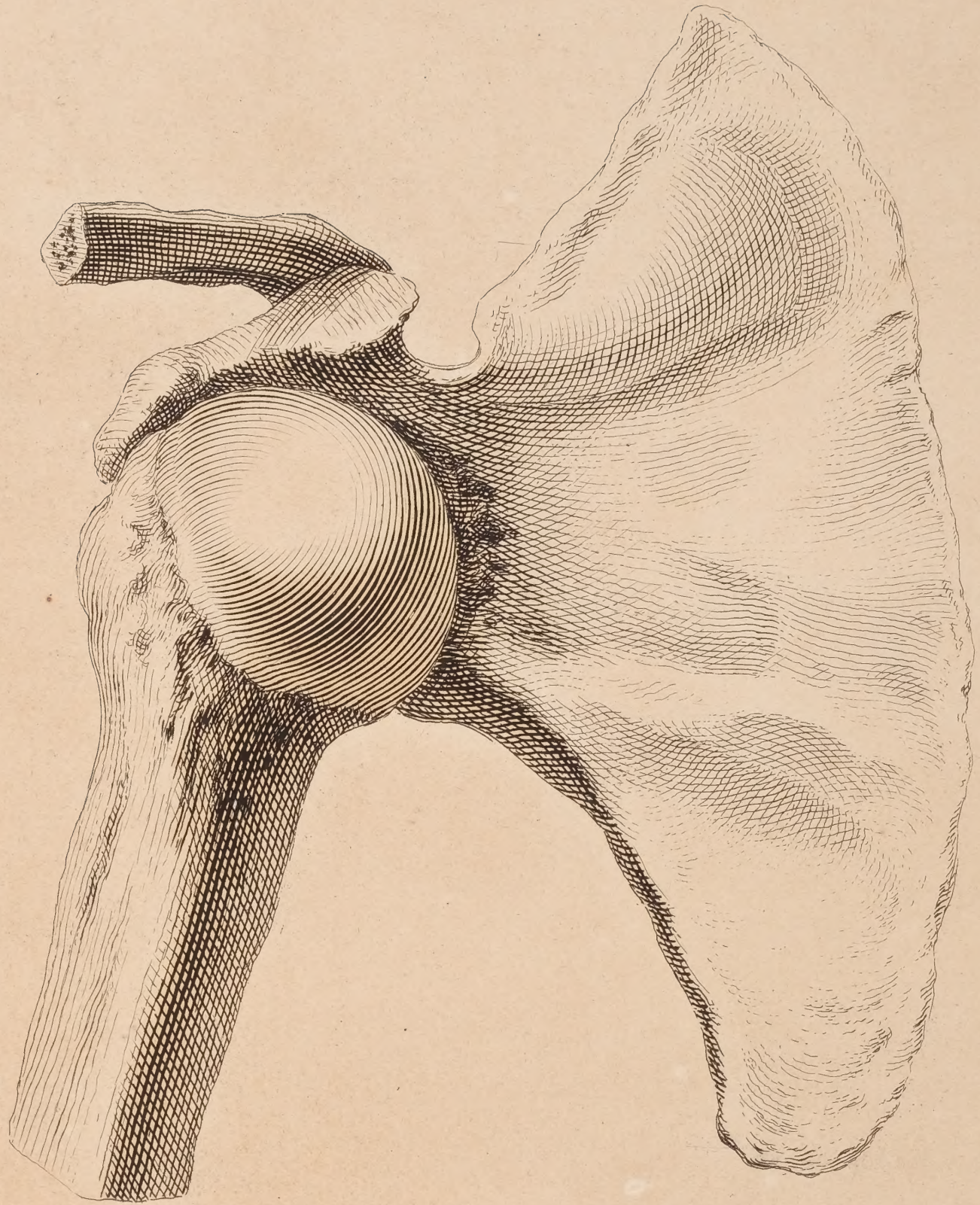
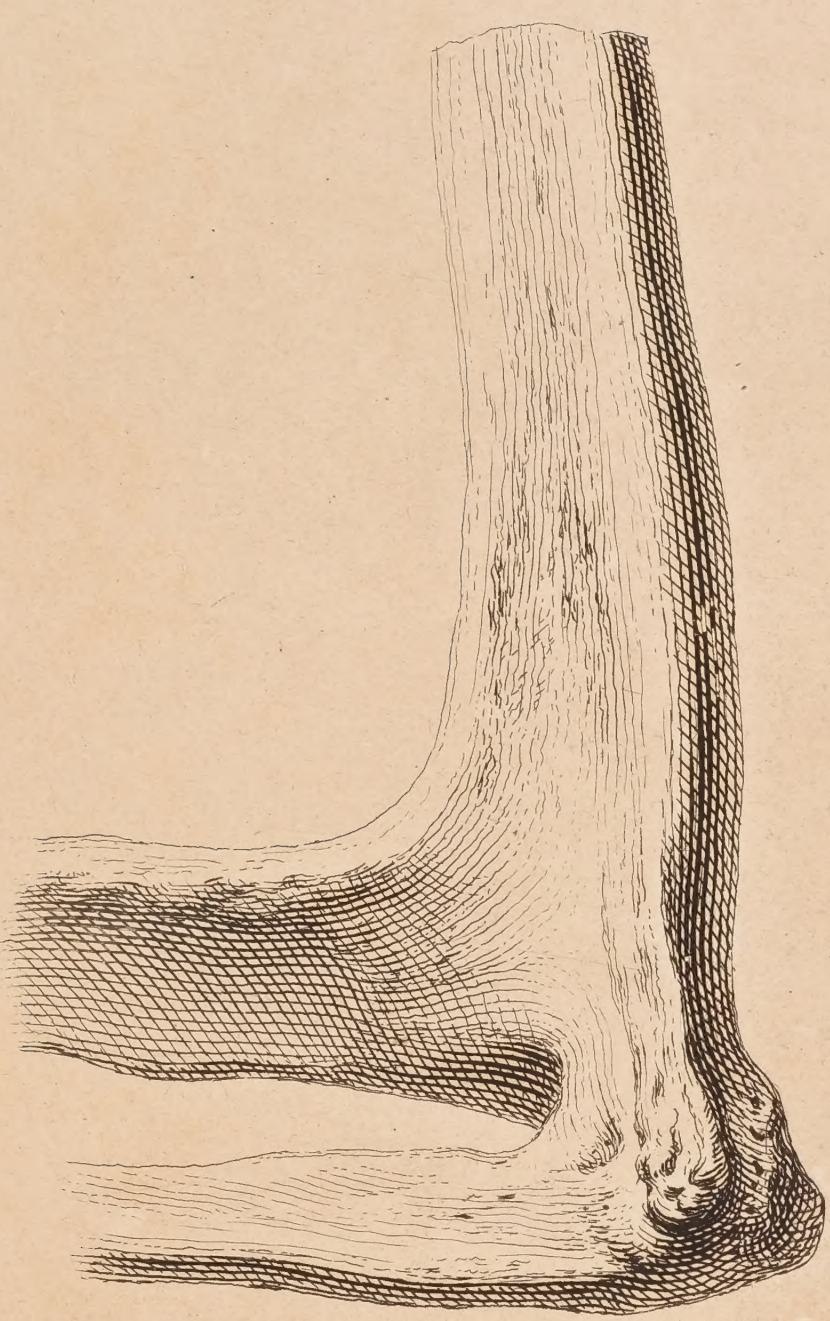


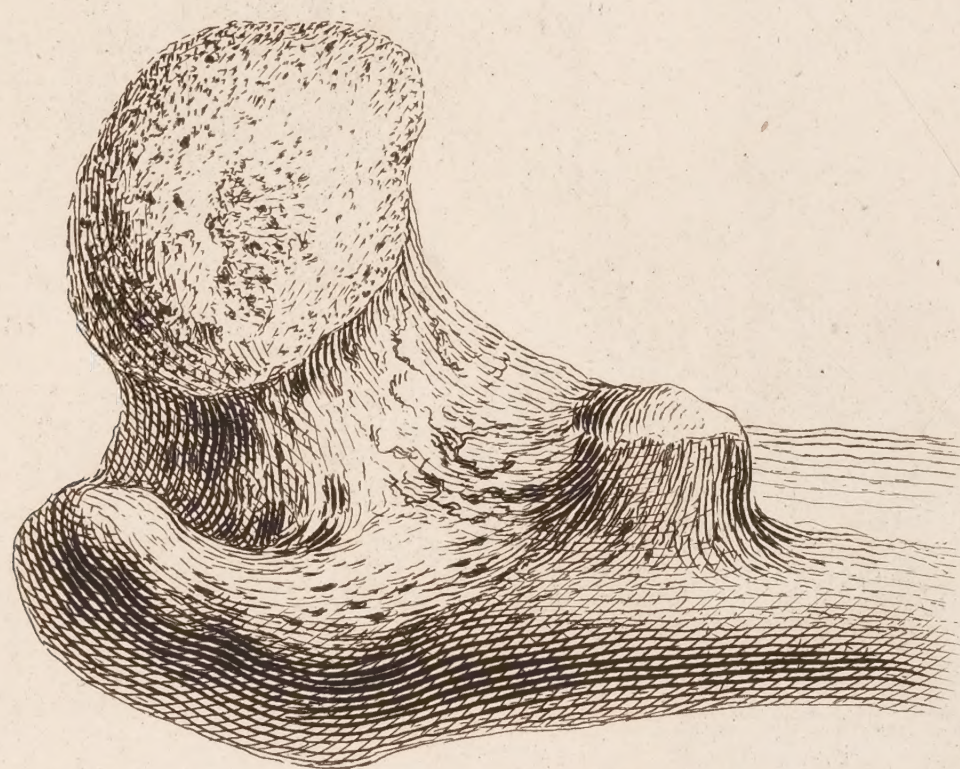












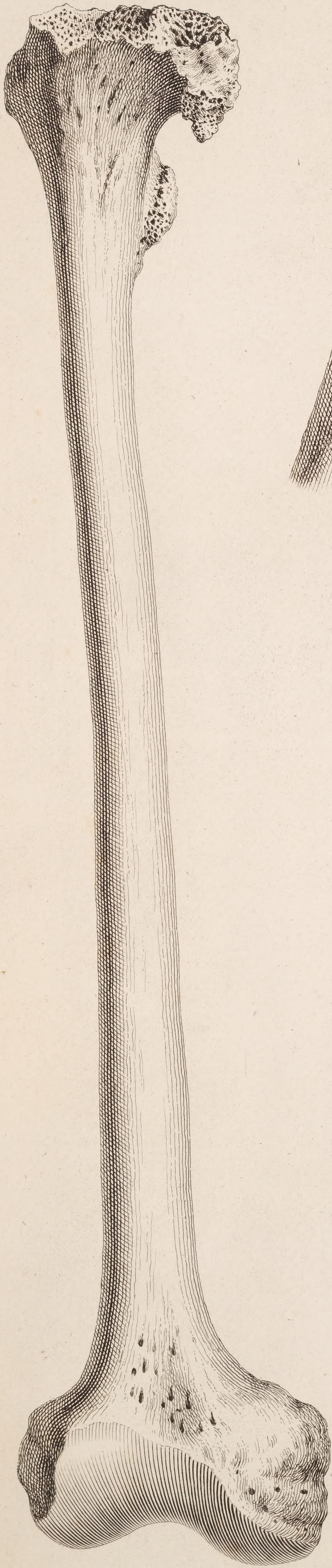
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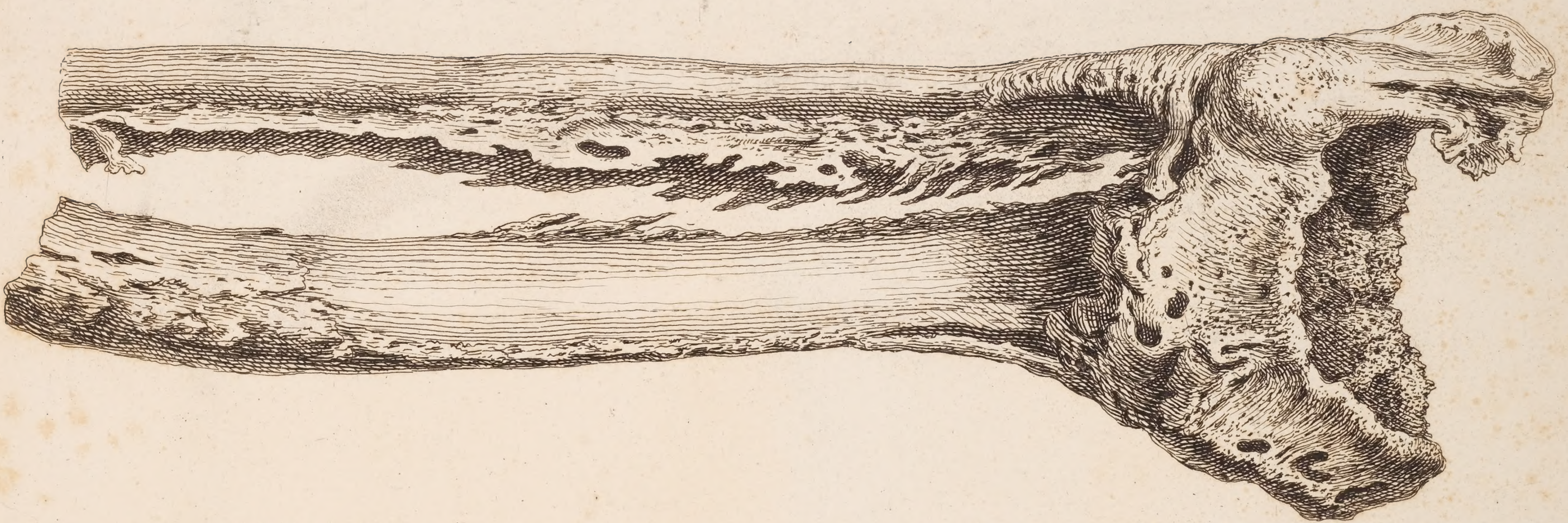




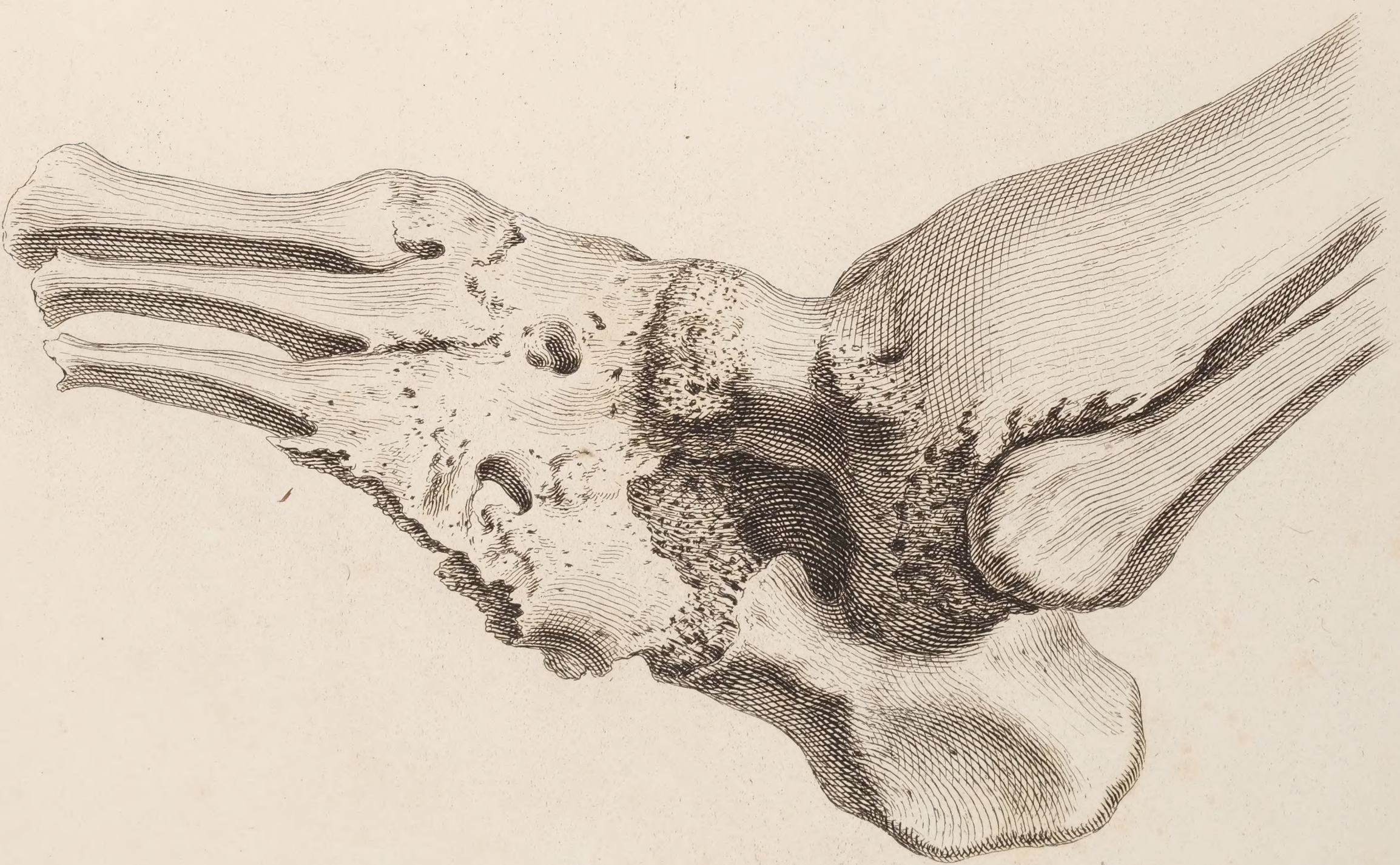
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